FISCAL YEAR 1984 EPA RESEARCH AND DEVELOPMENT AUTHORIZATION

HEARINGS

BEFORE THE

SUBCOMMITTEE ON NATURAL RESOURCES,
AGRICULTURE RESEARCH AND ENVIRONMENT

OF THE

COMMITTEE ON
SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

NINETY-EIGHTH CONGRESS

FIRST SESSION

MARCH 10; APRIL 19, 27, 1983

[No. 113]

Printed for the use of the
Committee on Science and Technology

35-157 O

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1984

H701-30

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RAYMOND J. McGRATH, New York
CLAUDINE SCHNEIDER, Rhode Island
ROD CHANDLER, Washington
TOM LEWIS, Florida

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FISCAL YEAR 1984 EPA RESEARCH AND DEVELOPMENT AUTHORIZATION

THURSDAY, MARCH 10, 1983

House of Representatives,
Committee on Science and Technology,
Subcommittee on Natural Resources, Agriculture
Research and Environment,
Washington, D.C.

The subcommittee met, pursuant to notice, at 2:20 p.m., in room 2318, Rayburn House Office Building, Hon. Buddy MacKay (acting chairman of the subcommittee) presiding.

Present: Representatives MacKay, Brown, Andrews, Schneider, Lewis, and Chandler.

Staff present: Anthony Clark, technical consultant and Mary Beth McJury, minority counsel.

Mr. MacKay. I apologize for the delay. I will call the meeting to order.

Due to the absence of Chairman Scheuer, who has encountered a scheduling conflict, I will chair the meeting until his arrival.

The Subcommittee on Natural Resources, Agriculture Research and Environment begins its formal consideration of the fiscal year 1984 budget request for the research programs of the Environmental Protection Agency.

Regardless of our differences with EPA, we would have no quarrel with your program. Certainly all of us agree that research is at the heart of what EPA is all about. We have a great concern about the reductions that are reflected in this budget. We are concerned not only that the reductions will make the Agency unable to carry out its research responsibilities but that this inability would mean a cessation in the Agency's ability to carry out its program responsibilities.

Therefore, we are pleased to have you here today, and we anticipate that this will be a significant meeting and one that will enable us to come to grips with a number of these questions.

Mrs. Schneider will be asked to make opening comments.

[Statement of Mr. MacKay follows:]

Opening Statement by Buddy MacKay—Acting Chairman—Hearing on the FY 1984 EPA R&D Budget Request, March 10, 1983

Here with us today to present and defend this budget request is Dr. Courtney Riordan who only recently has been nominated for the position of EPA Assistant Administrator for research.

Let me extend my personal congratulations to you, Dr. Riordan, and say that I am pleased that the Administration has finally decided to fill this long standing vacancy with an experienced and dedicated career professional.

As I have said, we are here to discuss the budget request for EPA research and development which, frankly, I find most troublesome.

Mrs. SCHNEIDER. I am going to refrain from making any kind of lengthy comments. I just wish to welcome representatives of the Environmental Protection Agency here.

I think, despite what they say, you are living evidence that EPA still lives and carries on.

We welcome you here and look forward to your testimony today. I have enough questions to fill an hour's time, so I would like to proceed with the testimony so we can get on with the questions.

Mr. MACKAY. Mr. Lewis, do you have any opening statement?

Mr. LEWIS. Thank you, Mr. Chairman.

I would like to welcome Dr. Riordan and his colleagues here to the subcommittee today and to say that I am looking forward to hearing from Dr. Riordan on the fiscal 1984 budget for EPA research programs.

The Environmental Protection Agency is charged with important public responsibility to study and regulate a number of hazardous pollutants and many of these programs are of particular interest to the residents in my State of Florida.

Therefore, I will be interested to hear, Dr. Riordan, your proposals for fiscal year 1984.

Mr. Chairman, I would also like to ask for unanimous consent to include Congressman Ray McGrath's comments into the record.

Mr. MACKAY. There being no objection, so ordered.

[Statement of Mr. McGrath follows:]

HON. RAYMOND J. MCGRATH, EPA AUTHORIZATION HEARING, MARCH 10, 1983

I want to join the Chairman in welcoming Dr. Riordan here today.

In an agency embroiled in controversy, one can only imagine how difficult it is for the individuals in the agency to continue to function effectively. I want to commend Dr. Riordan on the job he is doing, and also congratulate him on his nomination by the President to be head of EPA's Office of Research and Development.

Dr. Riordan has been Acting Assistant Administrator for Research and Development for some time now and I am pleased he has been given this vote of confidence by the President.

I look forward to hearing his testimony.

Mr. MACKAY. I believe that concludes our opening statements.

Dr. Riordan, we will be pleased to hear your comments.

STATEMENT OF DR. COURTNEY RIORDAN, ASSISTANT ADMINISTRATOR DESIGNEE, OFFICE OF RESEARCH AND DEVELOPMENT, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY MATT BILLS, DIRECTOR, OFFICE OF MONITORING SYSTEMS AND QUALITY ASSURANCE, ENVIRONMENTAL PROTECTION AGENCY; DONALD EHRETH, DIRECTOR, OFFICE OF ENVIRONMENTAL ENGINEERING AND TECHNOLOGY, ENVIRONMENTAL PROTECTION AGENCY; ERICH BRETTHAUER, DIRECTOR, OFFICE OF ENVIRONMENTAL PROCESSES AND EFFECTS RESEARCH, ENVIRONMENTAL PROTECTION AGENCY; ROGER CORTESI, DIRECTOR, OFFICE OF HEALTH RESEARCH, ENVIRONMENTAL PROTECTION AGENCY; CARL GERBER, DIRECTOR, OFFICE OF EXPLORATORY RESEARCH, ENVIRONMENTAL PROTECTION AGENCY; PETER VOYTEK, DIRECTOR, REPRODUCTIVE EFFECTS ASSESSMENT GROUP, ENVIRONMENTAL PROTECTION AGENCY; AND SAMUEL RONDBERG, DIRECTOR, OFFICE OF RESEARCH PROGRAM MANAGEMENT, ENVIRONMENTAL PROTECTION AGENCY

Dr. RIORDAN. Thank you, Mr. Chairman. Let me say that I am pleased to be here to present you with the EPA proposed budget for fiscal year 1984. I would like to deliver a prepared statement and then receive your comments. I would like to introduce my colleagues who will assist me in responding to questions. On my left I have Matt Bills who directs our Monitoring Systems and Quality Assurance Office. Next to him is Erich Bretthauer who heads the Office of Environmental Processes and Effects Research. On my right is Roger Cortesi, Director of the Health Research Program. At the end of the table is Mr. Donald Ehreth, who directs our Office of Environmental Engineering and Technology.

In my statement I would like to describe some of the leading research activities we propose to undertake in 1984.

We are requesting a budget of $205.5 million and 1,212 permanent workyears. This is a decrease of $23 million and 137 permanent workyears from our 1983 resource levels.

Within these reduced resources, however, there are several major actions we are taking to improve the scientific quality, relevance, and usefulness of our research products. One of the highest priorities to improve the quality and validity of the data we generate is to implement and monitor a vigorous quality assurance program. An agency quality assurance policy committee has been established to oversee QA efforts and recommend any necessary remedial measures. In addition, we are writing a manual that will carefully describe the specific roles EPA and ORD managers must assume in implementing QA procedures. These enhancements are reflected by increased resources of $1.3 million requested in the Superfund, drinking water and pesticides media.

In another move to improve the scientific quality of our research, we have instituted a laboratory peer review program. Major portions of the program are being peer reviewed on a systematic basis according to headquarters' guidelines.

Through several internal management reforms we aim to improve the timeliness and usefulness of our research products. First, we have modified our planning process to strengthen further the linkage between the research function and the client program offices in EPA. In consultation with the client program offices, we have developed broad strategy documents for each of EPA's major media responsibilities: Air, water, toxics, hazardous waste. These strategies provide the basis for formulating our budget request.

Second, we are implementing an automated information system which clearly links our strategic objectives to planned accomplishments and subsequently to specific research outputs. This system will provide us and our client offices with comprehensive status reports on research in progress and our researchers will be accountable for providing needed research products on a timely basis.

Let me now turn to some of the specific research areas to which increased resources will be applied. I emphasize that increases in these areas are all the more significant in the context of a smaller overall R&D budget.

In the air medium, we will accelerate the development of health assessments for potential hazardous air pollutants. Overall, we request an increase of $2.1 million to strengthen work on the assessment of criteria air pollutants and hazardous air pollutants.

Further, environmental research in water quality increases by $1.2 million, to provide additional support for the water quality based regulatory approach. This approach requires a strong technical underpinning to match control requirements to designated, site-specific uses. Our emphasis here reflects the nearing completion of the application of technology based controls.

Another area of increase is acid rain, augmented by $1.5 million to a total of $14 million for fiscal year 1984, to reflect our continued concern in understanding the causes, atmospheric processes and effects of this phenomenon. Total Government acid rain funding will be at $27.6 million in 1984, compared to $23.3 million in 1983.

Finally, there is an increase of $700,000 in toxics health effects, most of which is for improving techniques for extrapolating research effects from animals to humans.

This fiscal year 1984 budget request will allow for continued support, at approximately the same level as in 1983, of other critical programs whose products are needed by the regulatory programs. They include total health research resources, funded at $50.6 million in 1984, a slight increase over 1983, to insure that we continue to develop the information necessary to protect the health of the American people.

Ground water research also remains at substantially the same level in 1984, $8.1 million, and continues to contribute to the scientific and technical information base to help us respond to groundwater pollution problems through the variety of environmental statutes.

Health, environmental, and monitoring research to support the cost-effective implementation of the hazardous waste program will continue at levels comparable to 1983. Also, our Superfund support program will remain at 1983 resource levels, and emphasis will be placed on quality assurance activities supporting site assessments.

The National Crop Loss Assessment Network will be maintained, but at a slightly lower level, reflecting the completion of most field work.

The Research Outlook 1983, our 5-year research plan recently delivered to you, more fully describes our needs in and our focus upon these programs and upon other, cross-cutting issues which build on the products from this research. Our research budget for 1984 is derived from the 5-year plan which is closely linked with the broad strategies I discussed earlier.

A part of this research plan is exploratory research, which will also continue at the same level of funding in 1984. However, the Agency is instituting management changes in the research centers and grants programs to focus more effectively on long-term Agency needs.

The 1984 budget will continue to support the exploratory research centers at academic institutions throughout the country. Each center specializes in a particular area of research and seeks long-term solutions to environmental research problems. In 1984, some of the centers will be evaluated, and they will be more closely managed to assure that our long-term research needs are better understood and more clearly defined. The grants program will also continue to explore research problems that require long-term, innovative work to achieve solution. We will, however, institute changes to better integrate the products of the grants program into ORD and program office needs.

I will now turn to some of the major reductions that appear in our budget request. These, as noted earlier, reflect the completion of work in several programs and the reorientation of the program away from areas that are not as directly relevant to EPA's legislative mandates.

The largest reduction is $17.1 million in the environmental engineering program, where control technology development activities are largely eliminated. The exception is for the continued development of the limestone injection multistage burner [LIMB], which supports the acid rain research program and which, through preliminary tests, is proving to be cost-effective retrofit technology. Control technology reductions are mainly in the areas of air, municipal and industrial wastewater, and the spills program.

The results from the policy decision that such activities are more appropriately handled by industry. It is EPA's responsibility to develop and implement a regulatory strategy that is based on the best available scientific information provided by our own research program and from other sources. It is not EPA's responsibility to develop for the regulated community new technologies. Also, it should be noted that research in support of the effluent guidelines has been completed.

A reduction of $2.5 million occurs in the Great Lakes program reflecting the completion of research on eutrophication in the Great Lakes. Water quality research relevant to toxic contaminants in the Great Lakes continues in other programs. This, coupled with the results gained from the $34 million spent in the past 13 years on both eutrophication and toxic contaminants, obviates the need for a specific Great Lakes program.

Finally, a reduction of $1.5 million results from the elimination of the nonionizing radiation health effects program. This reflects completion of research work in support of the radiofrequency guidance, which will be proposed in 1984.

I would like now to describe the significant changes in the R&D budget in terms of the various media, and thus give you a sense of the directions in which we are going in each. I must add a point of clarification: The reductions in all media reflect the transfer of exploratory research funds out of each media and into the interdisciplinary media and therefore overstate the amount of reductions due directly to lessened programmatic activity.

Air research: We are requesting $51.2 million, a decrease of $8.2 million, $3.6 million adjusting for the grants transfer, from the fiscal year 1983 level of $59.4 million. The air research program will continue to provide support for the review and possible revision of ambient air quality standards. To provide this support, the program will place emphasis on improving the scientific quality of our air quality models; accelerating the development of comprehensive health risk assessments for potential hazardous air pollutants; assessing the health effects of exposure to various air pollutants; determining the transport, transformation, and fate of these pollutants in the atmosphere; and evaluating cost-effective, reliable emission reduction technologies.

The reduction in the program results in part from the elimination of control technology development activities since, as I stated, this is an area more appropriately left to private industry. EPA will concentrate on fundamental research, evaluation, and technical support. We will continue, however, to evaluate the reliability and cost-effectiveness of important emission reduction technologies. The reduction also results in part from the completion of several diesel health effects projects in the mobile sources research program.

Water research: We are requesting $19.3 million in fiscal year 1984, a reduction of $11.3 million, $10.2 million, adjusted, from the 1983 level of $30.6 million. There are two areas of emphasis in the water research program. First, a $1.2 million increase has been provided for increased work to develop techniques which the States and the Agency can use to effectively implement a water quality based regulatory program. Second, research will be carried out to increase our ability to understand the impact of the disposal of wastes in the ocean in order to support EPA in reviewing ocean dumping permits and applications for disposal of municipal wastes through ocean outfalls. In addition, we will continue to evaluate the cost-effectiveness of innovative/alternative municipal wastewater treatment processes and will continue to work on sludge management options and related health impacts. The reduction in water research reflects completion of the specifically designated Great Lakes research and elimination of technology development work which can be carried out by private industry, and the phasedown of the effluent guidelines effort.

Drinking water: The request is for $20.9 million in 1984, a reduction of $2.4 million, $500,000 adjusted, from the 1983 level of $23.3 million. The 1984 drinking water research program will continue to provide health, technology, and monitoring information to support the Agency's revision of the national primary drinking water regulations. Risk assessment support will be increased and additional work will be done on the health impacts of alternative disinfectants. We will continue to carry out research on drinking water treatment problems, particularly those of small systems. The Agency will also increase its drinking water quality assurance efforts which will allow us to increase the frequency of EPA regional laboratory audits from every 3 years to every year. Since these laboratories have responsibility for auditing State drinking water laboratories we believe this increase will insure more reliable drinking water monitoring. Finally, the Agency will continue research on the fate and transport of contaminants in ground water at current resource levels.

Hazardous waste: We are requesting $27.4 million in fiscal year 1984, a decrease of $5.6 million, $3.2 million adjusted, from the 1983 level of approximately $33 million. Research activities in this medium will provide the scientific data needed to support the cost-effective implementation of land disposal and incineration regulations. We will continue to develop procedures to support listing/delisting decisions and we will validate newly developed methods for identifying hazardous wastes. Through field testing, we will improve our ability to predict the behavior of hazardous wastes in the environment by determining the chemical-specific factors that control such behavior.

The major reductions in this medium reflect completion of hazardous spills control technology development activities, completion of preliminary evaluation for advanced thermal destruction techniques, and completion of the first series of technical manuals for land disposal and storage wastes.

In the pesticides area our research program will develop methodologies to more accurately determine the risks associated with pesticide exposures by integrating effects and exposure data.

In the radiation program we will concentrate on providing quality assurance to support Federal, State, and local radiation laboratories. The health component of this program, focusing on the effects of nonionizing radiation, is to be eliminated reflecting the completion of work in support of the radiofrequency guidance, which will be issued in 1984.

Additionally, we will continue our monitoring program at the Nevada test site.

In the interdisciplinary program, which includes the centers of excellence and the grants program, the increase of $11 million that appears in the budget is not a real increase but represents a transfer and consolidation of the expenditures for these programs into the interdisciplinary media. Essentially the funding in that area remains level.

The 1984 toxic substances research program will concentrate on determining whether chemical substances pose unreasonable risks to man and the environment. Test methods to measure these risks will be developed and validated using data from field studies. We will continue to improve our ability to predict the fate and toxicity of chemicals in the environment using structure-activity relationships.

Decreases in the toxic substances media result primarily from the completion of the total exposure assessment methodology study, the purpose of which was to develop methodology to better allow the program offices to survey the toxic chemical quality of our environment.

In the energy medium, the 1984 program continues to emphasize the development of our understanding of the causes and effects of acid rain. As I stated earlier, we have requested an increase of $1.5 million for continuing this research. Another major component of the energy program is the continuation of development efforts for the limestone injection multistage burner. A third major activity is the development and evaluation of health effects and engineering data which support the EPA regional permitting and enforcement activities for synthetic fuel plants.

In the Superfund area, while resources remain nearly the same as 1983, shifting priorities will result in emphasis being placed on providing a quality assurance program which supports site and situation assessments and Superfund enforcement activities. The need for this particular activity has become particularly paramount in light of the Times Beach type problems that we are facing and the need to come out with dependable environmental measurements of the contamination that exists around these sites.

I hope my statement has provided you with a satisfactory overview of our budget request. I believe this request for 1984 provides for a responsive, balanced, and high quality environmental research program. It is the product of much review and scrutinization from our many clients: the EPA regulatory and enforcement programs, regional offices, and the scientific and regulated communities.

I will now be happy to answer any questions you may have.

[The prepared statement of Dr. Riordan follows:]

STATEMENT OF
DR. COURTNEY RIORDAN
ACTING ASSISTANT ADMINISTRATOR
FOR RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT
COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

MARCH 10, 1983

Good morning, Mr. Chairman. I am pleased to be here to discuss the EPA's FY 1984 budget request for research. I would like to describe some of the leading research activities we propose to undertake in 1984.

We are requesting a budget of $205.5 million and 1,212 permanent workyears. This is a decrease of $23 million and 137 permanent workyears from our 1983 resource levels.

Within these reduced resources, however, there are several major actions we are taking to improve the scientific quality, relevance and usefulness of our research products. One of the highest priorities to improve the quality and validity of the data we generate is to implement and monitor a vigorous quality assurance (QA) program. An Agency QA policy committee has been established to oversee QA efforts and recommend any necessary remedial measures. In addition, we are writing a manual that will carefully describe the specific roles EPA and ORD managers must assume in implementing QA procedures.

These enhancements are reflected by increased resources of $1.3 million requested in the Superfund, Drinking Water and Pesticides media.

In another move to improve the scientific quality of our research, we have instituted a laboratory peer review program. Major portions of the program are being peer reviewed on a systematic basis according to headquarters' guidelines.

Through several internal management reforms we aim to improve the timeliness and usefulness of our research products. First, we have modified our planning process to strengthen further the linkage between the research function and the client program offices in EPA. In consultation with the client offices, we have developed broad strategy documents for each of EPA's major media responsibilities (air, water, toxics, hazardous waste). These strategies provide the basis for formulating our budget request.

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A part of this research plan is exploratory research, which will also continue at the same level of funding in 1984. However, the Agency is instituting management changes in the research centers and grants programs to focus more effectively on long-term Agency needs.

The 1984 budget will continue to support the Exploratory Research Centers at academic institutions throughout the country. Each Center specializes in a particular area of research and seeks long-term solutions to environmental research problems. In 1984, some of the Centers will be evaluated, and they will be more closely managed to assure that our long-term research needs are better understood and more clearly defined. The Grants program will also continue to explore research problems that require long-term, innovative work to achieve solutions. We will, however, institute changes to better integrate the products of the Grants program into ORD and program office needs.

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This results from the policy decision that such activities are more appropriately handled by industry. It is EPA's responsibility to develop and implement a regulatory strategy that is based on the best available scientific information provided by our own research program and from other sources. It is not EPA's responsibility to develop for the regulated community new technologies. Also, it should be noted that research in support of the effluent guidelines has been completed.

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I would like now to describe the significant changes in the R&D budget in terms of the various media, and thus give you a sense of the directions in which we are going in each. I must add a point of clarification: The reductions in all media reflect the transfer of exploratory research funds out of each media and into the interdisciplinary media and therefore overstate the amount of reductions due directly to lessened programmatic activity.

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The reduction in the program results in part from the elimination of control technology development activities since, as I stated, this is an area more appropriately left to private industry. EPA will concentrate on fundamental research, evaluation and technical support. We will continue, however, to evaluate the reliability and cost-effectiveness of important emission reduction technologies. The reduction also results in part from the completion of several diesel health effects projects in the mobile sources research program.

Water Research: We are requesting $19.3 million in FY 1984, a reduction of $11.3 million ($10.2 million, adjusted) from the 1983 level of $30.6 million. There are two areas of emphasis in the water research program. First, a $1.2 million increase has been provided for increased work to develop techniques which the States and the Agency can use to effectively implement a water quality based regulatory program. Secondly, research will be carried out to increase our ability to understand the impact of the disposal of wastes in the ocean in order to support EPA in reviewing ocean dumping permits and applications for disposal of municipal wastes through ocean outfalls. In addition, we will continue to evaluate the cost-effectiveness of innovative/alternative municipal wastewater treatment processes and will continue to work on sludge management options and related health impacts. The reduction in water research reflects completion of the specifically designated Great Lakes research and elimination of technology development work which can be carried out by private industry, and the phase-down of the effluent guidelines effort.

Drinking Water: The request is for $20.9 million in 1984, a reduction of $2.4 million ($500 thousand, adjusted) from the 1983 level of $23.3 million. The 1984 drinking water research program will continue to provide health, technology and monitoring information to support the Agency's revision of the National Primary Drinking Water regulations. Risk assessment support will be increased and additional work will be done on the health impacts of alternative disinfectants. We will continue to carry out research on drinking water treatment problems, particularly those of small systems. The Agency will also increase its drinking water quality assurance efforts which will allow us to increase the frequency of EPA Regional laboratory audits from every three years to every year. Since these laboratories have responsibility for auditing State drinking water laboratories we believe this increase will insure more reliable drinking water monitoring. Finally, the Agency will continue research on the fate and transport of contaminants in ground water at current resource levels.

Hazardous Waste: We are requesting $27.4 million in FY 1984, a decrease of $5.6 million ($3.2 million, adjusted) from the 1983 level of approximately $33 million. Research activities in this medium will provide the scientific data needed to support the cost-effective implementation of land disposal and incineration regulations. We will continue to develop procedures to support listing/delisting decisions and we will validate newly developed methods for identifying hazardous wastes. Through field testing, we will improve our ability to predict the behavior of hazardous wastes in the environment by determining the chemical-specific factors that control such behavior.

The major reductions in this medium reflect completion of hazardous spills control technology development activities, completion of preliminary evaluation for advanced thermal destruction techniques, and completion of the first series of technical manuals for land disposal and storage wastes.

Pesticides: We are requesting $6 million in FY 1984, a decrease of $.5 million ($200 thousand, adjusted) from the 1983 level of $6.5 million. Our research program will develop methodologies to more accurately determine the risks associated with pesticide exposures by integrating effects and exposure data. In particular, we will improve methods to assess the exposure of sensitive farm-worker populations to pesticides so that the risks to these groups can be determined more accurately.

Overall, this program shows a small decline reflecting the completion of projects in test method development and monitoring.

Radiation: We are requesting $233 thousand in FY 1984, a decrease of $1.5 million from the 1983 level of $1.7 million. The radiation research program will concentrate on providing quality assurance to support Federal, State and local radiation laboratories. The health component of this program, focusing on the effects of non-ionizing radiation, is eliminated reflecting the completion of work in support of the radiofrequency guidance, which will be issued in 1984.

Additionally, we will continue our monitoring program at the Nevada Nuclear Test Site. We perform these surveillance services under a reimbursable arrangement with the Department of Energy.

Interdisciplinary: The request is for $18.1 million in FY 1984. This is an apparent increase of $11.0 million over the 1983 $7.1 million. Through the Interdisciplinary program, EPA manages the exploratory research program which includes the Centers of Excellence and the dissemination of technical information products to the various user communities. The increase of $11.0 million results from the transfer and consolidation into this medium of exploratory research funds from other media.

Toxic Substances: We are requesting $23.8 million in FY 1984, a decrease of $3.4 million ($2.2 million, adjusted) from the 1983 level of $27.2 million. The 1984 research program will concentrate on determining whether chemical substances pose unreasonable risks to man and the environment. Test methods to measure these risks will be developed and validated using data from field studies. These risk methods development activities will provide an improved means for supporting TSCA risk assessments and the premanufacture notification process. We will continue to improve our ability to predict the fate and toxicity of chemicals in the environment using structure-activity relationships.

Decreases in this media result primarily from the completion of the Total Exposure Assessment Methodology Study, the elimination of funding for the National Center for Toxicological Research (NCTR), and a reduction in fate and effects studies reflecting the completion of several projects. Any future funding for NCTR will be on an issue-by-issue basis.

Energy: In this medium, we are requesting a total of $23.5 million in FY 1984, a decrease of $1.5 million ($82 thousand, adjusted) over the 1983 level of $25 million. The 1984 energy research program continues to emphasize the development of our understanding of the causes and effects of acid rain. As I said earlier, we have requested an increase of $1.5 million for the acid deposition program. Another major component of the energy program is the continuation of development efforts for the Limestone Injection Multistage Burner (LIMB) control technology. This technology combines NO_x control with simultaneous control of SO_2 and offers potential benefits in terms of reduced capital and operating costs for coal burning boilers. A third major activity is the development and evaluation of health effects and engineering data which support the EPA regional permitting and enforcement activities for synthetic fuel plants. These efforts will allow industry and government officials to identify and resolve problems in advance which otherwise may impede the timely commercialization of the synfuels industry in an environmentally acceptable manner.

Superfund: We are requesting about $6.4 million in 1984, a change of $.1 million from 1983 levels of $6.3 million. While resources remain nearly the same as 1983, shifting priorities will result in emphasis being placed on providing a quality assurance program which supports site and situation assessments and Superfund enforcement activities. Technical support activities will also continue in evaluating technologies to be used during removal and remedial operations. Further, the research program will support on-scene coordinators by producing a handbook which they may use to make decisions regarding the necessary extent and duration of emergency and remedial response actions.

I hope my statement has provided you with a satisfactory overview of our budget request. I believe this request for 1984 provides for a responsive, balanced, and high quality environmental research program. It is the product of much review and scrutinization from our many clients: the EPA regulatory and enforcement programs, Regional Offices, and the scientific and regulated communities.

I will now be happy to answer any questions you may have.

Mr. **MacKay**. Thank you for that statement, Dr. Riordan. Many Members of Congress share my concern that this reduced budget, following two other budget years where the research budget was substantially reduced, is leading the EPA down a path which will find it unable to fulfill its statutorily mandated mission or respond effectively. It seems that it is leading in a way to a narrowed definition within the Agency of its view which seems to be encompassed in the statement that research will primarily support the immediate regulatory needs of the Agency. That would be another way, it would seem, of saying we want to do the research to enable us to respond to the crises. My question is: Does that not guarantee that we are going to continue to have crises to respond to?

Dr. **Riordan**. That is not the intention of the budget. The budget does include a significant component of work which will be dedicated to what we call long-term research. We have the exploratory program which, I believe, is going to be funded at approximately $13 million, which supports our centers of expertise and our grants programs. We also have a significant amount of work in our laboratories that would be classified as long-term research. Therefore, we do have a long-term research component of the budget that we are proposing to Congress. The budget has been developed in the deliberative process in terms of the Agency and the administration which has taken into account those concerns, and we think, at this point in time, adequately takes into consideration the possibility for crises in the future.

Mr. **MacKay**. Let me follow that up by asking you specifically, if, in the interdisciplinary research program, which is your long-term basic research performed through grants to universities and agencies external to EPA, my understanding is correct. My understanding is that the statute mandates that 15 percent of the research funding be used for this basic research. It appears that your request in this budget is 9 percent, rather than 15 percent, it is $18.1 million, is there some problem in this program that leads you not to have confidence in it?

Dr. **Riordan**. I think the problem here, Congressman, is how that is being interpreted. In prior testimony and understanding between ourselves and Congress we have interpreted the 15-percent requirement as applying to the R&D part of the budget. I believe the R&D part of our budget is about $100 million. The R&D portion of the request in 1984 is $111.7 million; $18 million over the $111 million should figure out to about 15 percent or more.

Mr. **MacKay**. We understand those numbers, but there appears to be a difference in interpretation of the statute. Our interpretation is that the statute requires 15 percent of all research funds appropriated to the Agency.

Dr. **Riordan**. In that instance, Congressman, we could go back. I, unfortunately, don't have the figures, but we did go through an exercise last year estimating what the amount of long-term research in-house and externally would be to match it up against that 15 percent as measured by the total budget. We found that 20 percent of our program fell into the category of long-term research. I would guess that we could make a similar breakdown of the total budget. I have it right here; 18 percent of the total budget is now in the long-term research program, when we include the exploratory research in the base. I can provide this for the record.

[The material follows:]

PERCENTAGE OF 1984 RESOURCES DEVOTED TO LONG-TERM EXPLORATORY RESEARCH

EPA's Office of Research and Development (ORD) 1984 request includes $36,567,000 for long-term exploratory research, which is 33% of our extramural request ($111,669,000) and 18% ORD's total request ($205,509,600). This resource total is made up of three components: Exploratory Research Grants ($10,000,000), Exploratory Research Centers ($3,360,000), and longer term extramural research activities in the base program ($23,307,000).

Mr. MACKAY. We would appreciate that. My understanding is that EPA proposed transferring this program to the National Science Foundation.

Dr. RIORDAN. That was in the budget request, Congressman. We then had discussions with the National Science Foundation and found that it was not in our interest to transfer the program. They are not really geared up to manage a program that would be responsive to our needs, and we concluded it would not be an operation that we would promote. We had originally proposed that it be a pilot program where we would transfer $4 million to NSF to see if they could manage the program. We have now, I believe, informed the Congress that that is no longer an Agency proposal. We will continue to manage the program internally in EPA.

Mr. MACKAY. I don't want to unduly extend this line of question but simply would, for my part, say this is an area of continuing emphasis and concern by the subcommittee, and we will be following closely the Agency's further actions in this area.

I have other questions, but I think it would be better if we went around and then I'll take a shot the next time around.

Mrs. Schneider.

Mrs. SCHNEIDER. It's so wonderful having a freshman as the Chair and who understands the difficulty of being at the other end of the line.

I would like to ask some questions having to do with indoor air pollution. I just received in this morning's mail a copy of the Agency's proposal for the indoor air research program, and I really think there is a good possibility we can work things out here. However, I do have some questions.

The text of my amendment, which we had submitted to the EPA, was for the most part accepted. There are some areas of concern. You have struck the section there which provides for authorizing funding for the study. I would like to have some idea as to what amount of money EPA would be willing to settle for if this committee is going to move to fund some indoor air research.

Dr. RIORDAN. Excuse me, Congressman, did you receive an outline of a mechanism for an integrated indoor air regulatory strategy? Is that what you are referring to?

Mrs. SCHNEIDER. What I have is a copy of my amendment with comments on it by Lee Modesitt.

Dr. RIORDAN. Basically I am not familiar with that transmission. We have been thinking over the indoor air pollution legislation of last year, and how we might address it this year. As you know, there is ongoing right now in EPA an indoor air characterization research project that will extend to next year. There is no money in the fiscal year 1984 budget presently proposed to do further studies and characterization.

Mrs. **Schneider**. How much would you like to see in 1984?

Dr. **Riordan**. I am told, and this is the sense of what I have here right at the moment, that in spite of the fact that we have an NAS study in the area and have quite a bit of research going on, there hasn't been a convening of a group of experts who seriously think about what can be done other than research. Most of the NAS proposal relates to research—further research. They are relatively general. They did indicate some priority areas such as cigarette smoke; and carbon monoxide and formaldehyde are chemicals of particular concern. What we are proposing is we task a group of individuals from Energy, HUD [Department of Housing and Urban Development], EPA, CPSC, and CDC to, within a period of 6 months, convene and look over the results of studies that are more recent: the CDC sick-building-syndrome studies; the EPA studies that we will have some preliminary results on; the studies by Bonneville Power Administration; and the studies by DOE.

We need to come up with either a statement of further research needs or a statement of what might be done in terms of some proposals for action in one fashion or another; a symposium to look at the indoor air pollution problem in light of the current information, and try to determine what is the next best step. EPA, in our mind, does not have a regulatory mandate to do this alone, and some of the problems that might be identified would really fall within the domain of other agencies for potential action.

Mrs. **Schneider**. How recent is the National Academy of Sciences report on indoor air? Do you recall?

Dr. **Riordan**. It was published in 1981, but I suspect the data they were working with was no later than 1979, I would guess.

Mrs. **Schneider**. What they were calling for was strengthening the research rather than regulating. More in the area of research.

Dr. **Riordan**. It's interesting. It's a little ambiguous. I pulled out some statements when I read this on my way over here. For example, they make a statement: "For a limited number of air contaminants that can be found in residential and public buildings there is direct and circumstantial evidence that human exposures are large enough and common enough to account for substantial morbidity and premature mortality." Then they say: "However, our knowledge of the extent of the exposures and of the exposure response relationships is inadequate to permit measurement or even estimation of the resulting morbidity and mortality." Later on all of the recommendations deal with getting better information on exposure assessment; methodology development to better measure contaminants; health effects and behavioral effects research; more building design and operation studies; and more product studies. That is essentially the list of recommendations they come up with.

Mrs. **Schneider**. Obviously, since you are referring to that with ease, somebody, if not yourself, at EPA has reviewed the National Academy report.

Dr. **Riordan**. That's right. I read it when it first came out, and then I went back before this hearing to refresh my memory.

Mrs. SCHNEIDER. This committee has been looking for a response to that report seeing as how we are deeply involved in the funding aspects of it. It's almost 1 year now, that if I recall correctly, this committee did ask for EPA's response to the National Academy of Sciences comments on indoor air pollution, and I think we would still be interested in having some real strong specifics. You mentioned a number of different agencies that would be getting together to research it further, and you mentioned a 6-month time period. Can we pretty much hold you to that?

Dr. RIORDAN. What I mentioned was an idea for consideration by this committee, and I would guess by some of the other Federal agencies that it might be a useful way to address the problem, that is, to convene a group of experts who have jurisdiction over various aspects of the building industry that might impact on the air pollution problem. The idea would be to have them review the available information and come up with a statement by the Federal Government on what it ought to do relative to indoor air, whether it be to increase research or whether it be something more than that.

Mrs. SCHNEIDER. I guess the only thing that concerns me is that we keep hearing, time after time, month after month, in testimony before this committee, that there has been so many symposiums all over the world, the World Health Organization has been involved in it and all over the country, that it's very frustrating to see that we're looking for yet another symposium. I mean, how many symposiums does it take before we can come up with a research game plan?

Dr. RIORDAN. I think you ought to get more than just researchers together. Most of the symposiums that I am familiar with have had research individuals involved. For example, I personally attended a series of meetings up at the University of Massachusetts about a year and a half ago, sponsored by Harvard, and there were a lot of research papers presented but there wasn't much representation in terms of policy from the various agencies that might have an interest in carrying out a more focused research program to address a problem that is recognized by the Government.

Mrs. SCHNEIDER. The reason that I had introduced this indoor air pollution amendment would be to essentially put a stop to many of the symposiums and gatherings that have been taking place informally and bring it to the forefront and having a multiagency involvement in developing an actual program. I am hopeful that this amendment, obviously, is moving right along through the House and through the Senate. I am hopeful that EPA will rise to the forefront and grasp it and say let's develop a plan and let's do it in 3 months and get moving with it. But I think, I at least and my colleagues, this is now the third year that we've been having in-depth hearings on indoor air pollution and we would like to see a program developed soon.

The other thing that I was interested in asking you about had to do with some of your plans for monitoring overall, and obviously hazardous waste is on everybody's mind at this time. I'm interested in knowing about the degree of research into ground water pollution as it relates to hazardous waste.

Dr. RIORDAN. We have a significant ground water pollution research program funded at a level of, I believe, about $8 million.

Our ground water research has been consolidated into our drinking water program. The program is largely what I would call methodological in nature, in the sense that we devote our resources to providing methods that can be used by the program office and the consulting community in examining ground water problems. For example, we are concentrating on developing better methods for taking on contaminated samples so you can analyze what's down there. We are doing a good deal of work on predicting the movements of organic materials in subsurface environments because that's so critical in being able to assess what future risks might be associated with contaminated aquifers. We are also developing work in the area of reclamation techniques. But in terms of our going out examining the quality of ground water in a evaluation study, we don't do that sort of thing in the research end.

Mrs. SCHNEIDER. I realize that. I guess what concerned me is that there are some moneys there, a bit of an add on in the monitoring systems for drinking water, but the health effects, I guess, is something that particularly concerns me; not just in the drinking water but also in the general toxic waste. Most of the health research that has been done by EPA so far and by other agencies seems to focus on just single toxic compounds. I think that testimony we heard before another one of my committees on cancer policy, clearly indicates that there is a lack of information dealing with the mixtures of various types of hazardous compounds. We have a long way to go before we understand those. Yet when I look at the health effects part of the budget here it's substantially reduced.

Dr. RIORDAN. I don't think so. The health program overall has actually gone up from 1983 by $0.6 million. According to the figures I have the total health research program in 1984 that's proposed is $50.6 million which is an increase of $600 thousand. If you look at the individual media, that shows one decrease and that's in the water quality area but that really is an artifact, largely, because we took the health research that was being funded out of the water quality media and moved it into the drinking water area. The reason was that the real interest in health effects in water lies with the drinking water problem; that's where the water people concentrate their expertise. Overall, if you take into account the moneys that are in the grants program that will continue to be devoted to health research, I think that's one of the confounding factors, but by moving money out of each of the media into the grants program, that is, into the interdisciplinary media, you see decreases that are only artifacts of the budgeting process. That's one problem. The other one has to do with that move from water quality to drinking water which is an attempt to consolidate the program into an area where our clients, the program offices, best need work.

Mrs. SCHNEIDER. I'm going to have to take some time to study up on these changes. I was looking at the budget that you provided us with with the current 1983 estimate under health effects as being $45 million and then the present budget for 1984 $41 million meaning a reduction of $4,361,000 or so.

Dr. **Riordan**. Sam Rondberg tells me that was before the grants are taken into account. If you put the grants back in that are devoted to health research, the total goes back up.

Sam, why don't you give the exact figures.

Mr. **Rondberg**. If you correct for the grants, taking them out of the 1983 program, the reduction in the base health program is $1.36 million. Counterbalancing that in the scientific assessment program results with ORD overall having an increase of almost $2 million. So the net increase for total health effects is about $600 thousand.

Mrs. **Schneider**. OK. I, too, am very concerned about jeopardizing the questioning. Having been at that end for a while I will defer to my colleague and do another round later. Thank you, Mr. Chairman.

Mr. **MacKay**. Thank you.

Mr. Andrews.

Mr. **Andrews**. Thank you, Mr. Chairman.

Will you tell us how many dollars and what kind of funding is in the Superfund for the development of disposal technology?

Dr. **Riordan**. There would be no research funding for development of disposal technology under Superfund. The Superfund research program is dedicated solely to the delivery of existing technologies or the taking of existing technologies and writing manuals or guidance for the use of that technology. Superfund money should be spent on those activities which directly assist in clean-up.

Matt Bills can point out that we do have development research going on under our hazardous waste research program.

Mr. **Andrews**. All right. That's where I would like to go and I'd like to ask you to please expand on that a little bit.

Dr. **Riordan**. Could I defer to Matt?

Mr. **Andrews**. Surely.

Dr. **Riordan**. I'm sorry, Matt is the Research Committee Chairman. Mr. Ehreth will answer.

Mr. **Ehreth**. Resources in the Superfund are used to collate material; are used to provide for guidance manuals of operation—they're more of an operational oriented product as opposed to a research effort. We rely on our entire research program for input into the Superfund-type of guideline whether it be in terms of modeling, engineering, or in terms of multimedia modeling or whatever. The hazardous waste engineering research program's resources are currently split about equally between land-based technology evaluation and nonland base, or in other words, thermal processes incineration and other advanced processes, such biodegradation processes as chemical detoxification systems, etc. The current emphasis is on land-based alternatives primarily because of the proposed regulations associated with land-fills. In those areas, the type of work that we're concentrating on is the compatibility with organic wastes and liner materials; these are synthetic liners. There is a tremendous concern as to whether or not the liners resist long-term aggravation or contact with organic wastes. Consequently, we are working with private industry and the National Sanitation Foundation to develop the type of test methods that would be able to predict a long-term lifespan of these synthetic liners.

Mr. **Andrews**. Let me interrupt you and ask you to be more specific. When you say you are working with private industry what are you doing?

Mr. **Ehreth**. We work with universities and with the liner manufacturing companies. For instance, they provide their materials and with the National Sanitation Foundation, which is located in Ann Arbor, Mich., they are developing the testing methods, if you will, to determine integrity of liner materials over a long-term period.

We are also conducting activities associated with evaluation of various cover materials. Once the landfill serves a useful purpose it has to be covered and we have to determine whether or not that covering mechanism is appropriate and will protect and guard for concerns such as ground water pollution.

We have produced six documents, which we call technical resource documents, I don't have them right here in front of me but I could furnish those for the record.

Mr. **Andrews**. Let's do that. I would like to attach those to the record.

Mr. **Ehreth**. I can get them when we have a break and get right back to you.

The important thing is that we have provided that technical resource documentation for backup of the regulatory efforts.

Let me switch gears a bit and go into the other areas of research currently ongoing. We are evaluating the performance efficiency of industrial incinerators; their capability to destroy hazardous wastes. We have recently completed the design, fabrication and construction of a mobile waste incinerator and we have it permitted now in the State of New Jersey. We are about to go to a Superfund site in the Kinbuc Land Fill to evaluate the destruction of soils contaminated with PCB and other chlorinated and hydrocarbons in the waste incineration process. We have a combustion research facility that is studying incineration combustion processes for purposes of defining such parameters as residence time, temperature, and the compability of certain wastes for combustion. We have ongoing activity, regulatory impact analysis [RIA] it's called, which investigates or reviews operating incinerators in terms of their efficiency and their costs in the destruction of hazardous waste. In general that's the type of research we are conducting. As I mentioned before we do have some chemical detoxification work at a bench skill level, and a little bit of work connected with genetic engineered organisms.

Mr. **Andrews**. Doctor, thank you. That's all the questions I have.

Mr. **Ehreth**. I could look those documents up and get right back to you.

Mr. **Andrews**. If we could get those attached to the record sometime today.

[The material follows:]

Completed TRD's

1. Evaluating Cover System for Solid and Hazardous Waste SW-867 (GPO Stock No. 055-000-00228-2) $4.75.
2. Hydrologic Simulation on Solid Waste Disposal Sites SW-868 (GPO Stock No. 055-000-00225-8) $6.00.
3. Management of Hazardous Waste Leachate SW-871 (GPO Stock No. 055-000-00224-0) $11.00.

4. Guide to the Disposal of Chemically Stabilized and Solidified Waste SW-872 (GPO Stock No. 055-000-00226-6) $6.00.

5. Closure of Hazardous Waste Surface Impoundments SW-873 (GPO Stock No. 055-000-00227-4) $5.50.

1. Lining of Waste Impoundment and Disposal Facilities (Orignial) SW 870 (Revised) NTIS PB 81-166-365.

2. Hazardous Waste Landtreatment (Original) SW 874 (Revised—Review of OMB) NTIS PB 81-166-107.

Mr. **EHRETH**. The actual documents or the names of the documents?

Mr. **ANDREWS**. The names of the documents would be fine.

Mr. **MACKAY**. Mr. Lewis, do you have any questions?

Mr. **LEWIS**. Thank you, Mr. Chairman.

Dr. Riordan, your budget calls for no research on the health effects of the industrial pollutants discharged into the bodies of water. Don't you feel this would be an appropriate area for EPA to be involved?

Dr. **RIORDAN**. Yes, definitely, Congressman. We are involved by looking at the health effects of contaminants in water. However, in our budget proposal that work is funded under the drinking water program rather than the industrial waste water program.

Mr. **LEWIS**. How much is that? Do you know offhand how much money you have budgeted this year compared to last year?

Dr. **RIORDAN**. Excuse me. Mr. Rondberg has those figures.

Mr. **RONDBERG**. Drinking water health effects research is funded at $9.1 million in 1983 and $8.75 million in 1984.

Mr. **LEWIS**. This is a small decrease, but with the problems that we have out there currently and television is just having a heyday with you, could you give me any indication why rather than increase the program you decreased it?

Dr. **RIORDAN**. I wonder if someone else could help me with that. Roger, could you help me on that drinking water?

Mr. **LEWIS**. If you want we can come back to that, Doctor, I have a couple of other things.

In your testimony you stated that the national crop loss assessment will be maintained at a slightly lower level. The Clean Air Scientific Advisory Committee called NCLAN an excellent program and recommended that it receive continued support. Could you comment on a proposed reduction and the reason for it?

Dr. **RIORDAN**. Yes; in 1983 we will be completing data sets for major crops which are part of the assessments in the NCLAN program. In 1984 part of the dollars will be devoted to assembling all the material that has been gathered on about 75 percent of the crop acreage in the United States. The 1984 money, therefore, is not only for field work, but also includes carrying out the economic assessments that are necessary to provide the program office with the economic information that they can use in setting welfare standards for ozone.

Mr. **LEWIS**. Where is that research being carried out?

Dr. **RIORDAN**. It's managed out of our Corvallis Laboratory, but the research sites are spread throughout the country. I'll refer to Erich Bretthauer, who can give you the exact locations.

Mr. **BRETTHAUER**. Yes, Congressman. I think what you are getting at is the UV Beta program in the University of Florida which is not a part of anything that you are questioning.

Mr. **Lewis**. You are in tune.

Mr. **Bretthauer**. That program is funded out of a different source and is continuing. It was funded last year at about $100,000—in fiscal year 1983. We plan to fund it about the same in 1984. There's work going on at the University of Florida in Gainesville where we are looking at UV Beta effects on corn, wheat, rice and soybeans.

Mr. **Lewis**. That will be fine, thank you.

Dr. Riordan, you mentioned also—what I'm concerned about is the reduction in the control technology in industrial waste water. Can you comment on the reason for this reduction?

Dr. **Riordan**. Yes; that reduction was planned in association with the Agency's Office of Water. They have now generated, I believe, 19 best available treatment technology guidelines of a total of 24 guidelines to be developed for major discharges. Our research program in this area, which took place from 1975 to 82, was directed primarily at developing technology for the purpose of meeting best available technology [BAT] requirements. Now that those BAT requirements have been adopted, and are being put into guidelines by the program offices, that specific research has been geared down this year, and now we are proposing to eliminate it in 1984.

Mr. **Lewis**. Can we go back to the first question on the reduction on drinking water?

Dr. **Riordan**. Yes. Dr. Cortesi would like to respond to that, Mr. Congressman.

Dr. **Cortesi**. Since the exploratory grants appear under the drinking water heading in 1983, but appear in a separate heading in 1984, one must make an adjustment for the two years to be comparable. Once this adjustment for the grants is made, there's an increase of about $0.5 million in drinking water health research. That is largely increased work on alternative disinfectants in drinking water.

Mr. **Lewis**. I have one further question, Mr. Chairman.

Dr. Riordan, in the State of Florida and several other states, drinking water is becoming a very high priority area of concern and also in other areas of the United States. I am very much concerned that we need a high level of research into this area in order to control pollutants and discharges and things of that nature. In the agriculture areas I recognize we have unique problems but we also have a tremendous industrial waste that we have in the northeast and several other areas. I would just like for you to comment on what you feel EPA's total responsibility would be in this area and what level of effort should be pursued.

Dr. **Riordan**. Certainly the drinking water industry is characterized, largely by public utility-type suppliers. In some states there are private organizations, private utilities, that supply water, but I think largely we are talking about public utilities providing drinking water, generally not a profit-making activity. As a result, of this public nature of the activity, and as the result of the specific characteristics of research on drinking water, the Federal Government has played a major role in carrying out research on health effects associated with potential contaminants of drinking water.

The Federal Government has also played a major role in the area of development and evaluation of pollution control technology for treatment of drinking water. It also has, over the last few years, carried out research in the area of transport and fate of pollutants to predict how they might contaminate water supplies. Our program continues to do that; we have a drinking water research program which is designed to support national needs for health effects and transport and fate information.

Mr. LEWIS. Thank you Doctor. Thank you Mr. Chairman.

Mr. MACKAY. Thank you, Mr. Lewis.

Mr. Brown.

Mr. BROWN. Dr. Riordan, I have a little difficulty in asking questions which will elaborate on your budgetary situation but let me just give you my framework for thinking. You know I've been pestering you or your predecessors for the last ten years over the science, the research and the answers to questions we don't know the answers to. I have approached it from a lot of different directions like you ought to have a research plan and you ought to have better peer review. I have been concerned about our ability to determine human health effects of pollutants in the environment. I have the perception that we know as few answers today as we did 10 years ago. I'd like to ask you what your perception is.

Dr. RIORDAN. I may have a two-part answer. In the area of acute effects, from at least my vantage point, I am convinced we know more relative to acute effects, particularly in the criteria pollutant area than we knew in the past. For example, I believe that in terms of acute effects of ozone exposure on exercising healthy individuals, and to a certain extent effects of ozone on susceptible individuals, we have a better feel for where we stand.

Mr. BROWN. How about the effect of toxics?

Dr. RIORDAN. The effect of toxics. I'm not a health scientist, but let me give you my response and then maybe I could defer to Peter Voytek who is here from our Office of Health and Environmental Assessment. They deal with that difficult problem of what an exposure to a toxic material means, every day, in the Carcinogen Cancer Assessment Group and the Reproductive Assessment Group. I believe we have, just because of the machines that are grinding on out there, more test data than we had ten years ago; and on more chemicals. That test data goes from relative short-term bioassays to long-term feeding tests. As you know, through the NTP program and all the other research that goes on in this country, we have more than that data. In terms of some of the basic mechanisms that are involved in our exposure to toxics, I think we're a little better along, at least this is from my vantage point, than we have been in the past. We know about potencies associated with mutagens. We now talk about the difference between promoters and initiators. We now have more extrapolation techniques from observed effects to non-observed but potential effects. A lot more people are thinking about all of the various factors that are involved in determing whether low-level exposure—chronic exposure—to a pollutant may mean something in terms of chronic effects. Therefore, qualitatively, I certainly think we have advanced. We still have an awfully long way to go. It seems there's a great leap in judgment that has to take place to make a decision on a toxic material, in a low-level exposure over a long period of time, and the implications of health effects. Why don't I let Peter, who is an expert, respond if I may.

Mr. BROWN. Be happy to hear it.

Dr. VOYTEK. Congressman, about two years ago I would have certainly agreed with the statement that you made that we probably haven't made too much of an advancement in the risk assessment area. The two main problems, of course, that I think you are probably familiar with is the high to low dose extrapolations that are used for cancer and also the interspecies extrapolation going from test animals to humans.

Recently, there have been some developments in the field that will give us some pretty good ideas, we think, on what the shape of a dose response curve is at low levels. When I say low levels I'm considering levels that humans are exposed to. That information, I think, will help us shore up a lot of the assessment procedures: quantitative-type of procedures that we have been using in the past. Also, there is another problem and that's the connection between animal experimental results and what the human situation is actually like. There are also test systems that will be coming onboard in the not too distant future where we can bridge the gap between animal species, the reactions that are occurring in animals, and the reactions that are occurring in humans.

Mr. BROWN. Were you at the Academy dinner the other night where they discussed a mathematical risk assessment report that was just completed?

Dr. VOYTEK. No.

Mr. BROWN. The report stated, and I am sure you will have a chance to review it, that the uncertainties in both the areas you described were colossal. The major recommendation that came through to me, and I haven't studied it in great detail, is that we need to carefully distinguish between risk assessment policy and risk management policy, and we've been confusing the two substantially. You may be confusing them in your agency, I don't know. I wonder, just accepting that as a recommendation, could you indicate whether you feel that that's a reasonable recommendation, and do you think the Agency has a comprehensive risk assessment policy from which you do not normally deviate unless you explain the deviation?

Dr. RIORDAN. I don't believe we have a uniform risk assessment policy. We do have a policy on cancer effects that we have been adhering to fairly regularly through our Carcinogen Assessment Group. When it comes down to other health effects, I don't know that we have a uniform policy. Peter has been in the process of developing a reproductive effects guidelines document, and he could give you the answer on that. I guess I would ask could you clarify risk management versus risk assessment for me.

Mr. BROWN. Well, I'm adopting the Academy's definition, and I don't have it in front of me, but they make a very clear distinction between the two. They say that despite all the uncertainties in risk assessment you can have a uniform policy for conducting a risk assessment. If you try and use that as the assessment, manipulate that for the purposes of achieving a preselected risk management policy you mess up the science quite a bit. Unfortunately, I think, we are all guilty of doing that. We do it here in Congress, too. I commend the report to you because I think you ought to at least make some reference to it.

The main point that I was really trying to get out is my perception is that we still don't know the answers to most of these questions. We do not know how to extrapolate from rat and mice studies to humans. You wouldn't assert that we do, would you?

Dr. **Voytek**. No.

Mr. **Brown**. I have not yet seen anybody with any confidence in those dose response curves yet.

Dr. **Voytek**. There is some information that our office is working on where we have animal studies available and we also have some epidemiology data from humans. We are making the comparisons there just to see how close the connections are.

Mr. **Brown**. Epidemiology is another one of my peeves. On page 11, Dr. Riordan, you say that you are going to get improved methods to assess the exposure sensitive farm worker populations to pesticides. How long have you been trying to do that?

Dr. **Riordan**. That program has been in existence at least four years, to my knowledge, Congressman. Roger Cortesi could probably help me on that.

Dr. **Cortesi**. I think that's about right. The current budget proposes a more aggressive research approach toward other than healthy adult people. This has both been approached by human studies of getting better exposure to children, to see if there is any difference in the way they absorb things, and by pursuing animal research and seeing whether exposure leads to developmental problems later on.

Mr. **Brown**. That's very commendable. I think that your greatest research opportunity is better epidemiological data on those exposed populations, which give you a range of susceptibility. Yet, if I were to ask you today what the risk is to any population you couldn't give me an answer; at particular rates of exposure. First, you don't know the rates of exposure and second, you don't know what it does to you.

Dr. **Cortesi**. What it does to you, right.

Mr. **Brown**. Yet, you are cutting back on your overall research budget in the light of that almost unsurmountable amount of ignorance that we have in this area.

Dr. **Riordan**. Congressman, this is two years in a row that I have raised the question about epidemiology and why we can't do a better job, at least for fine particles. To set the total suspended particle standard, if we look at fine particles, we don't have an epidemiological data base that's any good beyond that, I believe, of the British studies of 30 years ago.

Roger has been looking into this. First, the University of Pittsburgh Research Center of Excellence for epidemiology was asked to do a problem definition feasibility study. They did that. However, it wasn't conclusive in terms of whether we could feasibly fund a prospective epidemiology study to get a dose-response relationship between exposure to fine particles and chronic lung disease. Not satisfied with that, I've asked Roger to work with the National Academy, and he is creating an arrangement with the Academy where they are going to be carrying out a more precise feasibility study relative to a possibility of carrying out a epidemiology study in this area in the future.

Roger, you might briefly explain some of the experience that we've had with the Ferris study out of Harvard where we have a five-cities monitoring study that has been going on for several years. They have been measuring indoor and outdoor exposures of individuals to criteria pollutants. They just don't see the ranges of exposure that would allow one to credibly design an epidemiology study.

Dr. CORTESI. I think we all feel that one of the major areas of environmental health damage that is unknown is the effect of air pollution on chronic obstructive lung disease. We are now working out an agreement with the National Academy to do a prominent definition and feasibility study, and one of the things that is stated, or will be when the work statement is buttoned up, is that if the conclusion is that such a study is feasible they will tell us where it is feasible, and why they arrived at that; not that just it should be.

Talking with various people in the field, my guess is, that the result of such a feasibility study is going to have something like the following conclusion: That it is impossible to get a group of individuals, measure what they are exposed to for probably decades and observe a different rate of chronic obstructive lung disease and be able to draw some conclusions, that is, we will not be able to directly get at the end point of concern by an epidemiology study. There is more optimism about the possibility of measuring pulmonary function test. That's where you see how fast you can fill up a bag or how many bags you can fill up. There is a feeling that we can probably observe decreases in pulmonary functions and do an epidemiology study that way. We are doing increased work on chronic exposure of animals and pulmonary lung function tests on animals and then examining the effects. I do not know that is the way the study is going to come out, but if it is going to be feasible, I think, that is the path to feasibility.

Mr. BROWN. The only way you are going to solve some of these problems is by taking exposed target populations, where you get the opportunity to do so, and conduct the best epidemiology you can. We should have done that after World War II; we should have done it in Vietnam with agent orange; we should be doing it in Missouri with the dioxin situation; we should be doing it with farm workers where we know there's exposures to chemicals; and don't tell me the technology isn't available to do it because I know it is. If I were a cynic, I would say you really didn't want that information, that the Agency didn't because you are afraid of what it will show, and that's my reaction to your cutbacks in health research; to your failure to fund the national toxicology program and some other things. I'm not a cynic. I know there are other reasons for this but if I were that's the way I would feel about it.

Thank you.

Mr. MACKAY. I have some other questions that I would like to ask.

Trying to make sure that we have really covered the various budget categories—I see this hearing as sort of the introductory hearing to make sure that we understand what you are trying to say to us, and from this we can refine the questions that we really need to be asking. In the clean air effort your Scientific Advisory Committee in this area issued a letter on January 5. That letter seems to very clearly say that your greatest need in this area is in the health effects area. Studies in the health effects area; epidemiology once again. I would like to know how this budget responds to that or whether you disagree with that assessment. Do you feel that the answer you have given to Mr. Brown is the answer to this question?

Dr. **Riordan**. Maybe I could just have a general response and then let Roger give you the specifics.

The budget is worked out in collaboration with the program office, the people that are responsible for setting standards. We have continually heard from the people that work in the regulatory side of the office that they would like good epidemiology. When it comes down to deliberating with them and designing the research program, we haven't yet been able to work out something that is, in everybody's mind, feasible and acceptable. I think that's been my view of what's happened in the last few years. As a result you don't see a real major item for that right now in connection with the criteria pollutants in the budget. Let me let Roger respond to see if I am correct in that.

Mr. **MacKay**. Let me just put a little more input into this. Unlike Mr. Brown, I haven't been here working away at you or with you for the past ten years. I've been in government at the State level, and my understanding is your function exists so we won't have 50 States trying to do this. I can tell you government at the State level doesn't have this capacity. If it's going to be done you all are going to do it. I see this as very central and very critical to what you're all about, and I see your function as the focal point of the environmental effort if the premises on which this whole effort is based are accurate premises. What you've got to tell me is can anybody do this. My impression is that nobody else but you can do it. The States certainly don't have this information.

Dr. **Riordan**. I can respond specifically to the question as it applies to criteria air pollutants and say it hasn't been demonstrated that we can do it, but why don't we let Roger either confirm or deny that.

Dr. **Cortesi**. Yes, sir. We, too, think epidemiology is extremely important, if it can be done. I explained to Congressman Brown our views on chronic obstructive lung disease and air pollution epidemiology. We have another feasibility and problem definition study underway on the question of arsenic in the drinking water. This feasibility study should be finished in another few months, and I think, on the basis of preliminary results that they are going to come to the conclusion that you cannot do an epidemiology study in the United States. Doing epidemiology studies is very difficult. I can go to the toxic waste problem, too. We have had very little luck at pulling the signal out of what we have seen at places like Love Canal. I can assure you, I think, that if we could have pulled something out of those places we would have because nobody likes doing negative studies.

Mr. **MacKay**. Should it then be concluded that your belief about this coupled with the budget reductions indicate that you think we're going to have to develop some way to work in the environmental area without early warning systems for effects of pollutants on health?

Dr. CORTESI. I don't think that, in general, we can go out and do research on an early warning epidemiology system. I don't think its feasible. In fact, I'm saying something much worse than that. I am saying that even when you have a testable hypothesis and can design the study to go after what you think is happening on the basis of animal data or other things, even then, it usually turns out these kind of epidemiology studies can't be done. The current EPA epidemiology research position is that a lot of thinking must be done on problem definition and feasibility before we go out and start looking at people and measuring because, as has been increasingly happening, otherwise you get nothing despite spending a lot of money.

We are in favor of epidemiology, but we are in favor of looking before we leap.

Mr. MACKAY. Dr. Cortesi, I would very much appreciate your going forward with this. I just don't find that to be an acceptable or satisfactory attitude. That same attitude would lead us to believe that you could not get a man outside of the Earth's atmosphere because up to the time they did it nobody had done it. You're basically saying I can't figure out how to do it. Is that what you're saying?

Dr. CORTESI. I'm not quite saying that.

Mr. MACKAY. There are a number of people responsible for your counterpart programs at the State and local level who believe they could figure out how to do it. Have you asked them? I would also like to ask one other question which is where do we get these standards now for safe tolerance for parts per million of Temik?

Dr. CORTESI. Parts per million of what?

Mr. MACKAY. Temik. I happen to come from Florida and there happens to be Temik in our water and we're being told it's less than 10 parts per billion so it's all right. Now, you're saying we don't know. How can anybody find out? Who decided it was all right?

Dr. CORTESI. That gets into the question of the regulatory process at EPA. I'm not ducking this, and what generally happens, almost always, is that there is never any health effects data on anything—animal, man, microbe—at the levels where we feel we ought to set standards to protect the public health. As Dr. Voytek discussed, in trying to assure that some level such as 10 parts per million of something in your drinking water is all right depends on getting the best dose response data you can, usually from animal studies. But those studies will be done at levels much higher than what you try and regulate against, and then by some process, you must extrapolate these data to get from a mouse to a man and from high doses to low doses. Those are extremely difficult risk estimation problems—which we are trying to improve through research.

Mr. MACKAY. With less and less dollars, therefore, less and less effort being put into the research as I understand it. The harder the problem the less we work.

Dr. CORTESI. In the health effects research program in EPA there has been a shift over the years from just straight dose response data taking to developing better methods to take data and finally into the better methods to make the two extrapolations. In 1984 it constitutes about 15 percent of the health effects research budget.

Dr. RIORDAN. Peter Voytek has indicated he might respond to you on that.

Mr. MACKAY. I would like to have that response and then I would like to go back to Mr. Brown who has a better feel for the right questions to ask.

I acknowledge I got an answer; it wasn't an answer I thought was responsive to the question I thought I asked so I must have asked the wrong question.

Dr. VOYTEK. You mentioned before certain parts per million that would possibly be an acceptable level to exposure of a toxic chemical. The question is: If you don't have any evidence in humans then what do you do? What you have to do is go back to the animal studies and take your best approximation as to what the human situation may be.

I think if you have all the toxicological data available to you and if you don't have any epidemiological studies, then you have to use that data in the best manner you can. This is where we get into conflict that in doing this we have to make many different types of assumptions. You also have different grades of toxicological data available to you. In some instances the toxicity data in animal systems might be very strong; in other instances it might be very weak. We're forced to make some type of decision with this data. On the other point I agree with what Dr. Cortesi said about the problems of epidemiological studies.

I mentioned before some test systems that might be available and be able to be performed on humans which may indicate that certain individuals are more sensitive to exposure to toxic chemicals than others. The question is to follow up on some of these studies; possibly on identified populations that have been exposed to toxicants and to perform these short-term indicator-type damage tests and to follow these people up later to see if they actually can be associated with future diseases in these populations. There's been the suggestion, too, from some of our workshops that there already is a human population that is being exposed to cancer chemotherapeutic agents which in themselves are quite toxic. These patients are followed up continually so they would be a good source.

Mr. BROWN. Thank you, Mr. Chairman. To my knowledge, at least some of the epidemological data that we're getting seems to be coming from other countries. I think the diesel studies in England are an example of that, if I'm not mistaken, is that correct?

Dr. CORTESI. Yes, sir.

Mr. BROWN. Do we have any kind of a systematic program for taking advantage of epidemology that might be done in other countries, and I'm going to follow this up with some specific examples, but I'm wondering if whether within your program plans there is any systematic effort to do that?

Dr. CORTESI. Where it is pertinent to EPA missions, yes. We do it through both staff in-house and through the Pittsburgh Epidemiological Center. I might add that on the diesel one, I think that bus driver study in England is a very good example. That study, in my opinion, was useless for EPA. It was a negative study. Anybody looking at what we know about combustion products and cancer would have predicted it as a negative study. It didn't do any help in saying you shouldn't worry about it or anything else. That is what I mean by it's very hard to do epidemiological studies.

Mr. Brown. I'm aware of the defects in the study. I'm also aware of a number of opportunities for conducting epidemology in other countries, where as far as I know, it isn't being done. For example, in some of the countries, like our neighbor to the south, Mexico, there are some areas in which, because of the rapid development of their chemical industry and their lack of regulatory policies, there's widespread exposure of populations to air, water, and other routes of exposure to all kinds of toxics. As far as I know, Mexico doesn't have a cadre of health scientists who are doing epidemology. I'm just raising the question with you, and I expect I know the answer, as to whether or not there is any effort to put in place epidemology in situations where it could produce information of use to the United States, even though it's on foreign populations.

Dr. Cortesi. Where we feel that an epidemiology study would help clarify some things, we ask in the problem definition feasibility study first the question: Can it be done in the United States and then the next question is: Do you think it would be worthwhile looking in foreign countries to see whether there are data which could be produced which would be useful for U.S. EPA regulatory problems?

I think it is important to note that lots of places are—I'm not saying this generally because obviously it can be helped—but lots of places where you have very high levels of pollution produce results that are corroborative of what we already know. This is nice to have, but it doesn't really add a lot of zip to our regulatory confidence at the levels where EPA feels it must set the standards in order to protect the public health. Yes, we look.

Dr. Riordan. We do not have a systematic program devoted to the identification of targets of opportunity for epidemiology as a general part of our program. We end up looking. For example, we have a program going on in Yugoslavia and South Africa relative to synfuels plants. We are looking at the possibility of an epidemiology study in a province in Southwestern China for exposure to PAH's, and I believe that's still going on.

Dr. Cortesi. It's underway. It's just getting started.

Dr. Riordan. These are all opportunities that have been identified as a result of first thinking about a problem. After you see a problem, then you see if there's anyplace else in the world that might give you the data base to allow you to do the epidemiology, as opposed to starting with the epidemiology in the first instance.

Mr. Brown. Obviously, if you're going to do a reasonable epidemiological study and it involves, we'll say, exposure to carcinogens it's going to have to be a long-term study, probably 10 years or more, and it's going to require a substantial amount of resources. I presume that you would be resource limited in undertaking any substantial studies of that type.

Dr. Riordan. That's right.

Mr. Brown. Thank you, Mr. Chairman.

Dr. Riordan. I think I should add that, were we to have a study that we identified right offhand, we would make a case to do it.

Mr. **Brown**. It has often occurred to me that we should have done some epidemiology on some things like black lung disease, 50 years ago, for example. I wonder if we went back and did a historical study we would find that suggestions were made for epidemiology and for one reason or another, perhaps through the influence of the coal miners, the coal companies, or maybe even the union, or Government agencies lacking the funds, they would have said it isn't necessary. We don't have the technique to do it. If you know of any such historical studies in a case like black lung I'd be interested in seeing it because it might have some policy implications for today's situation.

Dr. **Riordan**. If I might respond one more time. I don't know of any historical studies, but they would be useful to look at. I should point out the Times Beach situation and the hazardous wastes or Superfund sites situations. We are precluded from carrying out research in that area. I believe that health studies relative to Superfund sites is pretty much the domain of the Centers for Disease Control in Atlanta.

Mr. **Brown**. Do they have it for the same reason they were given the responsibility for agent orange? Namely that the agency that should have been doing it wasn't doing it?

Dr. **Riordan**. I don't think so. Roger, you might address this. I don't know what the legislative history of that was.

Dr. **Cortesi**. I believe we are prohibited by the Superfund law from going in and making health statements about the health of the local population. We are certainly not prohibited from going in and doing epidemiological studies, not for the purpose of deciding the thing, I think, but for our research purposes. In fact, we expect to have a report fairly soon in from our grants program where we went and did that up at Love Canal looking at the question of birth defects. Yes, we can't do them to go in and say these people are sick, but we can go in and do them to get data which would be useful for regulatory purposes.

Mr. **Brown**. Believe me, the thrust of my questions is not intended to harass any of you gentlemen whom I know are doing a responsible professional job. I think we are going to have to change our policy approach to this problem if we are going to not be asking the same questions 10 years from now that we are asking today. I hate to think of that happening.

Mr. **MacKay**. Mr. Brown, we are it, and I'd like to follow up on it. I'm going back to the letter I started out with. Now, that's an advisory committee set up by statute and that committee has given you a letter as of last January that says, in general, EPA's health effects research program for gases and particles is unbalanced. A balanced research program to support primary ambience standards development can be compared to a stool that requires three legs to maintain an upright position. You, I hope, have read it and all the rest of it. Now, that's saying you are not doing it right. They are people we put in place because we don't have the expertise, and I think we are entitled if you are not going to follow their recommendations to say to you, are they wrong. You're professional people. Are they wrong?

Dr. **Cortesi**. Yes, sir. Again, I was addressing that letter—I should have made it more clear. Yes. If we knew of epidemiology studies that we could do which would give us good data on air pollution, and for instance, chronic obstructive lung disease, we would do them in a minute. As I say, we are trying to see what we can do in that area which would give some useful data.

The question of whether more can be done in terms of acute effects from air pollution is less critical because in the acute effects we can use a clinical program. Even there again, if we had good ideas for studies, we would do them. I guess I have to say, that in my opinion, the committee underestimates the difficulty of doing what they say needs to be done. I think that we cannot really do what they say needs to be done.

Mr. **MacKay**. You are not challenging their qualifications or their competence?

Dr. **Cortesi**. They are competent professional people, and I think disagreements can exist between competent professional people.

Mr. **MacKay**. Do you have any alternative to what they recommended? I mean, I'm faced with a letter saying this is the most pressing need and a budget that's cutting back in that area, and you saying we disagree with them in that area.

Dr. **Cortesi**. We are addressing that issue directly, Mr. Chairman, by going to the National Academy of Sciences on problem definition and feasibility studies. I must admit that the choice of having this done by the National Academy was that because of letters like that and widespread feeling in the scientific community that this is done that if a "no" answer is to emerge it's got to come out with a pedigree on it that is a little bit better than Roger Cortesi sitting here telling you he disagrees with Dr. Goldstein. I understand your skepticism there, and that is basically our response. If there's a better one we will certainly do something about it.

Mr. **MacKay**. I have one other question which has to do with a provision in this Superfund statute, section 301(a)(1), which requires EPA to submit a comprehensive report to Congress by 1983, which shall include, among other things, an assessment of the degree of hazard or risk of harm to public health welfare and environment resulting from hazardous waste.

Have you done the research to meet those requirements, and if not, is the research reflected in your budget request. Among other things that statute appears to require is that you give us a report making recommendations for legislative changes, and it would appear to me this whole question of whether the Center for Disease Control is supposed to be doing the research or not, and you're prohibited from it, would be an area where we need to know that.

Dr. **Riordan**. We had work going on within ORD addressing something that was called degree of hazard that referred to particular chemicals—a list of chemicals that had been generated by the Office of Solid Waste. Work is being done to support the Office of Solid Waste by the Office of Health and Environmental Assessment, but it's strictly a support activity for the program office on a chemical-by-chemical basis. I would have to provide for the record anything more that we might know about that degree of hazard activity.

Mr. **MacKay**. That would be fine. We would like to just follow up with that, and perhaps our staff can follow up with you, and make sure we have a common understanding of what we think the statute requires.

I have one other question which is general, Dr. Riordan, and I would like your response. As a professional what are the most environmental problems that you think your agency will face, and what research needs will have to be undertaken to meet those?

Dr. RIORDAN. Certainly to give you a adequate response to that I should provide something for the record. I guess I could respond initially with some of the things that occur to me as being major problems that we face in the research end of this business. One of the first, of course, has to do with the problem that Congressman Brown has raised, and that is: How do we as an agency provide assurance to the public that the standards that we have out there for exposures to toxic substances in the various media are protecting them in a reasonable manner against the risk of long-term adverse health effects. That is a very tough nut to crack scientifically. I've done everything I could in terms of influencing our research program internal to EPA to try to get our researchers thinking along those lines and to carry out research that will in an integrated way try to respond to those questions. There's a lot of other research that goes on in the Federal Government, too, and we are concerned about better integration and coordination. Our people do, I think, a very credible job in attempting to keep up with what's going on and also coordinate our activities with the other agencies. We can provide you with a lot of examples of that. Another problem has to do with the chronic effects of exposure to what we call nontoxic pollutants. I refer mainly to the criteria pollutants. Our standards are based largely upon what we know about the acute effects, as measured in clinical experiments with human beings and measured in laboratory animal experiments. The issue of chronic effects, chronic obstructive lung disease and the other effects caused by air pollutants is one that we think has to be attacked. We are looking at that on several fronts. We have work going on in the Health Effects Institute [HEI] which we cosponsor with the automobile manufacturers of the United States. The HEI is looking at what we call biochemical markers and seeing if we can identify markers in test animals that would serve as indicators of long-term chronic effects that will take place as a result of long-term exposures. It's a speculative area of research, but we're applying a reasonable amount of resources in those areas.

We continue to have problems in the measurements area. I think that, although some people say the more you put into measurement the more you identify problems, nevertheless we have still outstanding difficulties in the measurement area, particularly having to do with reliability of methods. When you have to take something like a soil sample and put it through five or six wet chemical steps before you ever introduce it to a piece of equipment, such as a gas chromatograph or gas spectrometer, which you know is precise, the problem is those steps ahead of time offer the opportunity for a large degree of error.

The extrapolation of high to low dose and from animal to man, of course, is the problem that is really associated with the toxic chemical problem. I think that another area where we have difficulty and need in the long run to make improvements is in the ecosystem area. We've been relying in the past largely on single species bioassays to predict what is going to happen in the environment relative to fisheries. We're now working with microcosms in field studies which we feel are going to improve our ability to deal with the impact of toxic substances on aquatic ecosystems.

I left to last a problem being addressed by many researchers involved in lengthy studies—one which is of great interest in this country and with our neighbors in the north, and in Europe—and that's the acid rain problem. We have in the acid deposition research program in EPA in 1984 $14 million that's devoted to that problem. I think that amount of money is going to be adequate. It may not be adequate depending on what we see in the work that's going on presently. There are quite a few uncertainties out there concerning effects and the quantitative relationship between sources and receptors that I think should be understood better in order to address properly the acid rain question and the threats it has potentially for our environment.

Mr. MacKay. As I said at the outset this is our initial hearing. We have additional questions that we will submit to you and ask you to respond to for the record. I want to express our appreciation to you for your cooperation in this. This hearing has been very helpful.

Dr. Riordan. Thank you very much, Congressman.

Mr. MacKay. Thank you all very much.

We are adjourned.

[Whereupon, at 4:05 p.m. the subcommittee was adjourned, subject to the call of the Chair.]

FISCAL YEAR 1984 EPA RESEARCH AND DEVELOPMENT AUTHORIZATION

TUESDAY, APRIL 19, 1983

House of Representatives,
Committee on Science and Technology,
Subcommittee on Natural Resources, Agriculture
Research and Environment,
Washington, D.C.

The committee met, pursuant to notice, at 9:41 a.m., in room 2325, Rayburn House Office Building, Hon. James Scheuer (chairman of the committee) presiding.

Present: Representatives Scheuer, McGrath, Harkin, MacKay, and Schneider.

Staff present: George Kopp, staff director; Anthony Clark, technical consultant; and Mary Beth McJury, minority technical consultant.

Mr. Scheuer. The subcommittee will come to order. Today, the Subcommittee on Natural Resources, Agricultural Research and Environment will continue the formal consideration of the fiscal year 1984 budget for research programs of the Environmental Protection Agency.

The EPA has requested $205.5 million for these programs in research and into all aspects of environmental problems; $205.5 million is a reduction of about 10 percent from last year's funding and about 43 percent from fiscal 1981 funding.

When inflation is considered, the request of $205 million is equal to 88.1 million in 1972 dollars.

The dramatic reductions in EPA's research funding are alarming when one considers the severe environmental problems, such as acid rain, indoor pollution, hazardous waste, and the like that confronts the Nation.

Reductions in Federal research necessary to understand these problems, necessary to provide the decisionmakers, both in Congress and the executive branch, the data base they need to make proper environment decisions can seriously jeopardize the information base we need to develop rational and effective solutions.

The administration is telling us that cities and States and industries should take over the responsibility of doing environment research on their own. At today's hearings we will hear from at least the States as regards their point of view on the EPA research budget and their willingness to undertake environment research.

Our first witness will be a panel composed of the distinguished former member of this subcommittee and currently Governor of

Michigan, Gov. Jim Blanchard. We are absolutely delighted to have him back amongst us.

Sitting with him on the panel are three other members of the Michigan delegation, Congressman John Dingell, the chairman of the Energy and Commerce Committee, Congressman Bob Traxler, and Congressman Don Albosta. It is a great pleasure to have you with us today.

Before you start, I think it is only proper to say that the events of the past several months have demonstrated even the most casual observer that something has been terribly amiss at EPA. Virtually every day has brought evidence that actions by EPA officials have ended in subverting and delaying environment obligations created by a bipartisan majority in Congress.

The agency charged with protection of our Nation's health and environment has abdicated this responsibility and was willingly playing the role of primary spokesman for the corporate polluters. Regulated industries time and again were permitted to pass on favorable references from EPA reports and could change the thrust of Agency policy.

Recent polls indicate that the American people, whatever they may have done in the past, are no longer willing to accept business as usual at EPA. It is necessary to set a new course.

It is time to fashion an assemblage of distinguished scientists, and environmentalists, and corporate executives, plus experts in Government administration. To review EPA's operations and to make recommendations for long-term solutions.

It is the intent of this subcommittee to put together a nonpartisan blue-ribbon panel of experts to meet under the auspices of the subcommittee, to recommend changes in the existing law, to provide suggestions for improving the level of corporate responsibility in abating and cleaning up pollution, and in general to bring out structure for environment controls and our institutions for analyzing the problem and for implementing necessary regulations, into some sort of ability to meet the challenge of the explosion of toxic chemicals that is poisoning the landscape, the air, and the water of America today.

Before we hear our list of distinguished colleagues and ex-colleagues, I would like to appeal to my distinguished minority member Ray McGrath of New York with opening remarks.

Mr. McGRATH. Thank you, Mr. Chairman. I want to join in welcoming our distinguished panel of guests. I welcome back Governor Blanchard who sat on a committee with us for a number of years, and my colleagues from Michigan, and it seems that the State of Michigan seems to be quite well represented here this morning.

I look forward to hearing their views on the EPA budget as it affects the State of Michigan. Most of these that we have before us this morning are witnesses who are knowledgeable in the area of solid waste disposal. As you may be well aware, in my congressional district in Long Island in New York, we have a resource recovery plant which has been closed for the past 3 years.

The Hempstead recovery plant was closed because of both labor difficulties and also because it was found to be emitting dioxin.

I am going to be pleased to hear the comments regarding plants of this type, problems, and the views of the panels as to what kind of dioxin-emission standard should be set so that facilities like this can be opened. I understand that we have a representative from the city of New York. I understand when I was in the State legislature we appropriated some money for resource recovery plants of this type, and I would hope that these problems can be resolved before they go ahead with their facilities in order to handle their garbage problems.

Once again, I welcome our distinguished panels and look forward to their testimony.

Mr. SCHEUER. Governor Blanchard, will you take such time as you may need?

Governor BLANCHARD. Yes, if you would be so kind, I would like to read my statement for the record to summarize my testimony.

STATEMENT OF HON. JAMES J. BLANCHARD, GOVERNOR, STATE OF MICHIGAN

Governor BLANCHARD. First, I deeply appreciate your invitation to testify. I can't tell you how important Congress looks from the other end of government. I think from time to time we take for granted our responsibilities, and I miss some of the action with this committee and others, but the resources of the Federal Government, whether it is EPA or anywhere else, and the access of information here in Congress gives you a much greater opportunity to impact policy, and I think often times all we realize.

So, it is good to be back. In particular, I want to commend this subcommittee and our chairman, and the ranking members for their help in dealing with EPA's budget in a subject which is near and dear to my heart, preserving and protecting the Great Lakes research.

I am aware that the overall EPA R&D budget has been reduced dramatically these past 2 years. I am not an authority on all the different areas that they have worked on. I have sat through numerous hearings over the years, but what is happening to Great Lakes research, if it is an example of what is happening around the country, then I think we have to view it with some alarm.

I am here as a Governor to offer whatever cooperation our State can make with EPA, with the Federal Government, in working jointly to solve the serious environmental problems of our day.

I am here to talk specifically about the Large Lake Laboratory in Grosse Ile, Mich., which is critical to Great Lakes water quality research, and I would like to talk also about the need for greater EPA concern over the effects of toxics on public health.

I think now it has been 5 consecutive years that I have been advocating before you, as a member of this committee, funding for the Large Lake Laboratory, Grosse Ile, Mich. It is essentially the only laboratory which studies and monitors the effect of toxics in the Great Lakes upon human health.

I regret that this—the previous administration reduced funding for it, and the current one would abolish the facility altogether. I want to underscore for you into the record the importance of the Great Lakes.

It is not just a body of water surrounding Michigan and touching many other States and Canada. It is 95 percent of the surface freshwater of America. It is 20 percent of the freshwater of the world. It also can be a bell weather of many environmental problems which later affect other communities or bodies of water.

It sustains one of our most important industries in Michigan—tourism—as well as industry, shipping, and transportation. It affects the climate of the whole region. Michigan, by the way, happens to be a major agricultural State, largely because of its location. The Great Lakes, in addition to all the commercial, and economic, and recreational benefits provides water supply for 50 percent of Michigan's population and 10 percent of the U.S. population.

When you start adding its impact on Ohio, New York, Pennsylvania, Ontario, Wisconsin, Minnesota, Indiana, it is an important national resource which affects our economic well-being and most particularly our public health, as well as international relations.

We have a laboratory in Grosse Ile which was established in 1962 by EPA, which needs to survive, needs to stay open, needs to be funded; 5 straight years, we have now advocated keeping that facility going. It is, as I said, the only one that is dealing in a serious way with the effect of toxics on the human health in the lakes.

It has sophisticated computer equipment, perhaps some of it is going to have to be beefed up now in view of new-found threats to the environment, but it is uniquely suited to monitor, and test, and measure the effect of toxics in the lakes and upon human health.

I would be amiss if I didn't mention that I think it is in a particularly good situation to begin fairly soon testing the chemical dioxin and its effect on the environment.

Much has been written; much has been said. An awful lot of research is going to be required for the future, but the fact is that those who looked at the availability of the research facilities and the capability I think have concluded that that laboratory is in a good position to initiate and conduct vital research with regard to dioxin, or any other chemical, because the fact is that every year, perhaps every month, we are going to find toxics creeping into our food supply and into our environment.

I would not want to imply that dioxin is the only problem we have had. We have had problems before with PBB's, and PCB's, and kepone, and you know the chemicals better than I do. The gentlemen with me are aware of it. This is not a passing problem and should not be treated as a fad.

I am concerned.

Mr. Scheuer. Would the witness yield, please?

Governor Blanchard. I would be absolutely happy to yield.

Mr. Scheuer. I am passing up a copy of today's New York Times for you to look at. There is a front page story of dioxin and relates how the Dow Chemical Co. had its first meeting of its scientists about dioxin 20 years ago. They were very concerned then, that it was an extremely toxic drug.

They proposed a very unusual procedure for them. They called in a meeting of all their competitors to see if together they could come up with some solutions.

The one thing that they seemed to achieve a degree of unanimity on was that they didn't want the Federal Government to know about the problem, because they feared excess regulation and further intrusion of the Federal Government, so one thing they achieved consensus upon was keeping mum and making sure that the proper agencies of Government were not informed as to their concerns and their findings.

That consensus seems to have typified the degree of corporate responsibility and corporate statesmanship that the Dow Chemical Co. and the others have shown in the intervening two decades. The old corporate ways of doing business typified by big corporate statesman of the last century, J. P. Morgan, who said: "the public be damned."

I apologize for interrupting you, Governor Blanchard, but I couldn't help passing on that Times piece. It was so extraordinarily relevant to what you gentlemen are talking about today.

Governor **BLANCHARD**. Well I hadn't read the article, and I hope to do that before I leave, Mr. Chairman. All I can tell you is that dioxin is not the only threat to the Great Lakes or to our environment. You know, as well as I think everyone in this room, that with our modern technological society, we are going to continue to have problems both unintended and intended, a threat to our public health and to our natural resources, from pollutants, chemicals, and other things. That is why we have the laws.

I simply want to underscore the importance of the Large Lake Laboratory, not only because it can monitor and test, and help us therefore solve the important problems of the day, but also because it affects our relationship with Canada.

We have a water-quality agreement with Canada. That laboratory is really the one facility that helps monitor whether we are really living up to our commitment.

So, it is a matter of international concern, and I assure you over the years in dealing with Canadian officials and environmental officials that they have always been concerned about what appears to be a faltering commitment to living up to our side of the agreement.

Finally, let me say that I hope you will consider not only making sure that $2.5 million is in the authorization for the Large Lake Laboratory in Grosse Ile. I hope you will support additional funding to the degree that can be worked out between EPA and the States for dioxin research, and finally I hope you will again give your warm support to the Great Lakes Protection Act.

That was a measure that we were able to add to legislation last year. It passed the House of Representatives this year. As you may recall, Mr. Chairman, it was part of our authorization bill last year.

It was one of the titles, and I would like you to consider having that again as part of the legislation. In summary, it basically would require to various Great Lakes programs to be more closely coordinated.

I think in an era of limited financial resources, that is even more important today than ever before. I should also add that the GAO endorsed the legislation as something that could make our programs more effective. I hope you will consider adopting that legislation again in committee, and I stand ready to work with you on this.

In conclusion, let me simply thank you for your previous years of concern. I think it should be noted that you have shown a commitment to adequate and substantial research and development for EPA whether or not there is a momentary crisis.

With all the conflicts and confusion over who is running EPA and what they are doing, I think that it is important that people like you and panels like this continue the day to day and diligent work to keep adequate levels of R&D funding, and that we not allow it to get lost over who has done what and who shredded what downtown.

I thank you for this opportunity to appear, and I know my colleagues have much to add to what I have said.

[The prepared statement of Governor Blanchard follows:]

Testimony by James J. Blanchard
Governor, State of Michigan

Mr. Chairman, and distinguished members of this Subcommittee:

Having served as a Member of Congress for eight years, a member of the Committee on Science and Technology, and as a member of this Subcommittee, let me say that it is a great pleasure to appear before you here this morning.

Under your leadership, Chairman Scheuer, this Subcommittee helped lead the fight for full and adequate funding in the area of environmental research. In the area of Great Lakes research, for example -- an area of obvious and considerable interest to Michigan -- our modest but important success over the years in maintaining some measure of funding for programs aimed at preserving and protecting the Great Lakes and in enhancing research on the Lakes is a record of which we can all be proud.

This morning's hearing on the Fiscal Year 1984 research and development budget for the Environmental Protection Agency comes at an important time for the Agency. After two years of turmoil, the appointment of William Ruckelshaus gives the Reagan Administration an opportunity to take a responsible approach toward environmental issues. The time has come for the federal government to reverse its policy of environmental neglect and to once again work on behalf of clean air, clean water and the public health. This hearing also comes at an important time for the people of Michigan. I come before you to call your attention to three items of particular importance to my state:

* The need for a successful and well funded research and development budget in EPA to work hand in hand with states.

* The need to fully fund Great Lakes research efforts, in EPA and throughout the federal government.

* The need for EPA to pay closer attention to the effects of toxic chemicals on human health.

Let me take each of these matters in turn.

The environmental problems that affect this country are varied and complex. While cooperation between the EPA and states has occurred in the past, continued cooperation can only meaningfully occur in the context of a fair and just commitment on the part of the federal government -- including adequate levels of funding.

Each year, President Reagan has consistently proposed serious cuts in the EPA research budget -- from a $355.5 million funding level FY 1981 to a proposed level of $205.5 million for FY 1984. It is essential that this decline be arrested, and that the FY 1984 recommendation be rejected. Quite simply, the President's EPA research budget request ignores the need for adequate environmental research in the interests of public health. I cannot speak to the environmental research needs throughout the country. However, the needs which I can speak to -- that relate directly to the Great Lakes Region -- are underfunded in the President's budget.

With more adequate funding at the federal level, there can be a more meaningful partnership between federal officials and state officials in the area of environmental research. I am prepared to make a commitment of the environmental research capabilities in Michigan state government to work with federal research efforts to cooperatively resolve serious environmental problems.

The Great Lakes are a unique natural resource, comprising the largest single reservoir of fresh water in the world, 95% of the nation's surface fresh water and 20% of the world's surface fresh water. The 95,000 square miles of Great Lakes may indeed look like a vast, untapped and unadulterable resource. In fact, however, all of the flow of the Great Lakes has current use and value to individual states, to the Great Lakes region, to our nation and to Canada. We have also discovered that despite the vastness of the resource, we can cause its deterioration if we do not manage the resource with care and insight.

The Great Lakes were very significant in promoting the development of this region and continue to contribute substantially to the economy of Michigan and the Great Lakes region.

* Recreational fishery in Michigan is, annually, a $636 million activity.

* Tourism is Michigan's second largest industry.

* The Great Lakes modify Michigan's climate, making possible raising of specialty crops such as apples, cherries, grapes, and peaches.

* Million of tons of goods (minerals such as coal, iron ore and grains) are shipped annually on the Great Lakes.

* Significant amounts of hydroelectric power are generated from the flow.

* The Great Lakes provide process and cooling waters to countless industries in the region.

* The Great Lakes provide domestic water supply for 50% of Michigan's population and 10% of the U.S. population.

Recognizing the Great Lakes as a critical natural resource, state, federal and international efforts to manage and protect the resource have been in place for many years. Federal involvement in Great Lakes research began in the early 1960's. In 1962, the Large Lakes Research Station was established on Grosse Ile. Early efforts involved investigation and control of gross pollution problems on the Detroit River and Lake Erie. With passage of the Federal Water Pollution Control Act in 1972, the Environmental Protection Agency began to administer a $2.5 million a year budget at Grosse Ile. In recent years, research efforts turned more to eutrophication problems and study of the presence, effects and ultimate fate of toxic pollutants.

Yet, the Reagan administration has proposed to eliminate from the EPA budet $2.5 million for Great Lakes research. The practical impact of the reduction in Great Lakes research will be the closing of the Large Lakes Research Station on Grosse Ile. This reduction in funding undermines the U.S. effort to meet the terms of the Great Lakes Water Quality Agreement with Canada, and threatens the public health in the United States.

Nearly all of EPA's funding for Great Lakes water quality surveillance and the impact of toxic chemicals on the Great Lakes and on human health has been provided through the Large Lakes Research Station and through EPA's Great Lakes National Program Office. Collectively, the work of the Grosse Ile Research Station, together with EPA's Great Lakes National Program Office in Chicago, provides much of the monitoring, surveillance and data needed to manage and protect the waters of the Great Lakes. Without these efforts, it will be extremely difficult for us to understand the extent of water quality problems or the impacts of specific pollutants. In short, we will jeopardize our ability to manage the Great Lakes.

It is also necessary to underscore the importance of the Grosse Ile facility in toxic research. Toxic contaminants in the Great Lakes have been recognized as a problem for several years. Industrial and agricultural by-products and wastes have migrated to the Great Lakes. Mercury, DDT, PCBs and other contaminants have threatened Great Lakes fishery, wildlife and human health. Recent evidence shows that toxics may even be carried to the Great Lakes through the atmosphere.

Toxaphene and PCBs are currently entering the Great Lakes system primarily through atmospheric transport and deposition. This is a problem which obviously transcends state and national boundaries and can only properly be solved through national and international cooperation.

Other research efforts of vital importance to the Great Lakes must be funded as well. These efforts will be important not only to the Lakes but to the entire United States.

Most recently, a great degree of concern has surfaced over the chemical compound dioxin. The concern centers on recent information on contamination of some fish in several Michigan rivers with relatively high concentrations of dioxin and continuing concerns regarding dioxin contamination in the vicinity of the Dow Chemical Company in Midland. However, dioxin contamination, as you well know, has been a problem in several areas of this country. Significant dioxin contamination has been found at Love Canal in Niagara Falls, New York and Times Beach, Missouri. Herbicide spraying in Oregon has generated concern over exposure of residents and allegations of increased birth defects.

We feel very strongly that the dioxin issue is a national problem and must be addressed through national efforts. Much research and development needs to be done to better understand the toxicity and environmental fate of dioxin, the impacts on the environment of dioxin contamination and the potential risk from exposure of our citizens to dioxin. An environmental monitoring program needs to be implemented to determine the extent and degree of dioxin contamination in this country. Human health studies need to be carried out in known areas of significant dioxin contamination to determine if the exposure to dioxin has adversely affected the public health. Potential sources of dioxin contamination need to be identified and investigated. These projects are most effectively planned, coordinated and funded at the national level.

The Environmental Protection Agency and the Michigan Department of Natural Resources are currently formulating a research design that includes Michigan as one of four states to be studied intensively as part of a national dioxin study. The Michigan component of this study is estimated to be $2.6 million. I would urge this Subcommittee both to support efforts to provide funds for this study during the current fiscal year, and I urge this Subcommittee to earmark sufficient funds for this important work in the FY 1984 EPA Research and Development authorization bill.

I strongly urge that a specific amount of the funds authorized and appropriated for the Large Lakes Research Station be earmarked for a study of dioxin in the Great Lakes basin. The EPA laboratory at Grosse Ile is presently the only laboratory that has sophisticated computer and analytical capability. The modeling of transport, fate and bioaccumulation of dioxins in aquatic ecosystems -- which could be accomplished by researchers at Grosse Ile -- will provide analytical synthesis for both the state and the national studies.

Other studies in the dioxin area are continuing with the Food and Drug Administration and other federal and state agencies. All of us should support all appropriate research efforts in dioxin as to its impact on human health.

In addition, it is vital that we retain our commitment to the International Joint Commission. The International Joint Commission was created by the 1909 Boundary Waters Treaty between the United States and Canada. The IJC is a permanent body composed equally of Canadian and American members whose purpose is to develop solutions to boundary water problems ranging from lake levels to transportation, to air quality. One major accomplishment of the IJC has been the development of the Great Lakes Water Quality Agreement of 1972 which was revised in 1978. This agreement sets international goals for Great Lakes water quality.

The problem of Great Lakes pollution deserves study now as much as ever. Congress ought not tolerate efforts to curtail Great Lakes research.

Finally, Congress should seriously consider enacting legislation along the lines of the bill I sponsored during my last term in Congress, the Great Lakes Protection Act, which was passed by the House last year as Title IV of H.R. 6324, but died in the Senate. That Act, which was endorsed last year by the General Accounting Office, would make Great Lakes preservation and protection a national priority and help to better coordinate Great Lakes research efforts at both the federal and state levels.

This is the fifth year I have been in this room advocating funds to save the Large Lakes Laboratory at Grosse Ile. Each day we learn how important adequate research on the Great Lakes is to human health. An adequate research program at EPA is essential and should not be lost among more glamorous controversies affecting the agency.

I would like to congratulate the Subcommittee for its excellent record in this area, and for its interest in these vital issues. I will be happy to answer any questions.

Mr. SCHEUER. Congressman John Dingell, member of the Michigan delegation and the chairman of the House Energy and Commerce Committee.

Mr. DINGELL. Mr. Chairman, I thank you for the privilege of being with you this morning for an opportunity to appear with our Governor to testify to the concern of our delegation with regard to the protection of the Great Lakes, the environment of our area and Nation, and also with regards to the funding and the adequate performance of the Large Lakes Laboratory.

Mr. Chairman, I have prepared a statement which I ask unanimous consent to insert into the record at this point.

STATEMENT OF HON. JOHN D. DINGELL, CHAIRMAN OF THE HOUSE ENERGY AND COMMERCE COMMITTEE

Mr. DINGELL. Mr. Chairman, your subcommittee has over the years been responsible in large part for the continued functioning of the Great Lakes Lab at Grosse Ile, for which we commend you and thank you this morning.

This is an extremely important installation. It is one whose function is to perform research on water quality and other problems relative to the Great Lakes Basin. It is the only installation in the Federal Government which has this broad responsibility, and indeed because of the limited area under the jurisdiction of the several States, it is the only installation which can take a broad view of the entire water quality problems of the Great Lakes.

These are, as our Governor has indicated to you, the largest single reservoir of water anywhere in the world. Their continued water quality is a matter of utmost importance to the nation from every standpoint from industrial, to esthetics, to environmental.

The lakes are a resource for immense value for every purpose. To permit them to decline because of carelessness or unwise budgetary policy would be a disaster of the greatest magnitude. Our people in the Great Lakes take very seriously the need for protection of the Great Lakes.

It should be observed, Mr. Chairman, that research is enormously valuable, although not fully appreciated by this administration. Its function is to enable us to identify problems that exist in time that they can be corrected or to anticipate them before they arrive upon us.

Regrettably, continued budgetary cuts in programs of the EPA, particularly in regards to the Large Lakes Lab, have had disastrous impact upon its ability to inquire into the questions which have been entrusted to that Agency by law.

I would observe to you that the Large Lakes Lab is one which was set up by law, by the Congress of the United States. It should be observed, Mr. Chairman, that the questions of some of the recent concerns that your subcommittee and my Subcommittee on Oversight in the Energy and Commerce Committee have been going into are extremely important.

They relate not only to behavior inside EPA, but they also relate to the overall policies of this administration, with regards to the Environmental Protection Agency, and indicate that the Congress is on its way toward correcting some of the problems that have come to light.

But, Mr. Chairman, it must be observed that the pollutants and the hazardous substances which threaten life, which have come to light, are only a few of those which have— rather which are available to plague mankind—but are also only a few of those which will be uncovered as events go forward.

I have no doubt that if proper effort were made we could probably uncover one or two of these every month or every 2 months.

That is not really important, but what is important is that we must have the ability to analyze these questions to understand what the problems might be and to deal with them at an early time, rather than waiting until the perils become enormous.

Mr. Chairman, there are—the Large Lakes Labs can afford immense protection as to the environment. It can participate actively in preserving the Great Lakes, in allowing us to have both industrial development and a healthy and desirable environment.

It can also participate actively as was the intention of the Congress, and I mention it is the only institution that can do this, in providing the research and information which is necessary for our cooperative program with Canada, our neighbor to the North, for the protection of the Great Lakes.

The funding levels requested are minimal. I believe that, as our Governor has indicated, $2.5 million is not too much for this undertaking. The entire congressional delegation of our State has submitted to you a letter requesting your assistance in this matter, and I ask that a copy of that be made a part of the record at this time.

I would also ask to submit a proposal by the Cranbrook Institute of Science for a program with regards to comprehensive research, as the Large Lakes Research Center with regards to dioxin contamination to the waters in the State of Michigan.

I would observe, in conclusion, Mr. Chairman, that you probably stand as "Horatio at the bridge" because the administration proposes to zero off this laboratory in 1984. If this committee does not take action, it is quite probable that the administration will move another step forward in its efforts to terminate this particular laboratory.

With those remarks, Mr. Chairman, my commendations are to you and this committee for your efforts over the years on this matter of protection of the Great Lakes water quality and protection of the laboratory and having it do the job that Congress intended when it by statute created the institution.

I express again my appreciation, and it has been a pleasure to be with you this morning. Thank you, Mr. Chairman.

[The prepared statement of Congressman Dingell follows:]

HONORABLE JOHN D. DINGELL
SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT

APRIL 19, 1983

MR. CHAIRMAN: I APPRECIATE THE OPPORTUNITY TO PRESENT MY VIEWS TO THE SUBCOMMITTEE ON THE PROBLEM OF THE POLLUTION OF OUR ECOSYSTEM AND THE CRITICAL NEED TO CONTINUE RESEARCH EFFORTS THROUGH THE U. S. ENVIRONMENTAL PROTECTION AGENCY TO ASCERTAIN LEVELS AND SOURCES OF TOXIC POLLUTION IN THE GREAT LAKES.

THIS SUBCOMMITTEE IS TO BE COMMENDED FOR ITS EFFORTS TO ENSURE THAT ENVIRONMENTAL RESEARCH PROGRAMS OF THE FEDERAL GOVERNMENT ARE PROPERLY FUNDED AND MAINTAINED. RECENT INVESTIGATIONS BY MY HOUSE OVERSIGHT AND INVESTIGATIONS SUBCOMMITTEE, AS WELL AS INVESTIGATIONS BY THIS SUBCOMMITTEE, HAVE LOOKED BENEATH THE TIP OF THE ICEBERG AND HAVE UNCOVERED A TOXIC WASTE POLLUTION PROBLEM OF UNPRECEDENTED DIMENSIONS. IT IS A NATIONAL DILEMMA AND A PROBLEM REQUIRING IMMEDIATE ATTENTION.

THE GREAT LAKES ARE THIS COUNTRY'S LARGEST FRESH WATER NATURAL RESOURCES, AND AS SUCH, VULNERABLE TO NUMEROUS FORMS OF DEGRADATION AND TOXIC WASTE POLLUTION.

THE GREAT LAKES ONCE SUPPORTED MAJOR AND VALUABLE RENEWABLE FISHERY RESOURCES. HOWEVER, THE DECLINE OF THESE RESOURCES HAS BEEN DRAMATIC AND WELL DOCUMENTED. AT THE

TURN OF THE CENTURY, GREAT LAKES COMMERCIAL FISHERMEN LANDED ABOUT 110 MILLION POUNDS OF FISH PER YEAR; BY 1975 LANDINGS HAD DROPPED TO ABOUT 61 MILLION POUNDS PER YEAR. IN THE 1940'S AND 1950'S, LAKE TROUT, A MAJOR GAME FISH, VIRTUALLY DISAPPEARED FROM MANY AREAS OF THE GREAT LAKES, AND THESE FISH POPULATIONS HAVE NEVER RECOVERED. THE CONTRIBUTING CAUSES TO THE DECLINE OF THE GREAT LAKES FISHERIES INCLUDE HABITAT ALTERATIONS, CHANGES IN FORAGE FISH SUPPLY, OVERFISHING, PREDATORY SPECIES OF FISH, BUT MOST IMPORTANTLY, POLLUTION OF THE WATERS.

WHILE GREAT STRIDES HAVE BEEN MADE IN CLEANING UP THE GREAT LAKES, TOXIC WASTES ARE STILL DUMPED INTO THIS RESOURCE. THIS IS EVIDENCED BY THE RECENT DISCOVERY OF HIGHER LEVELS OF TOXIC AND DANGEROUS FORMS OF POLLUTION. STUDIES HAVE DISCLOSED THAT GREATER NUMBERS OF FISH SPECIES ARE BEING CONTAMINATED WITH DIOXINS AND PCB'S. THIS POSES A THREAT TO NOT ONLY EXISTING GREAT LAKES FISH POPULATIONS BUT TO THE HEALTH AND SAFETY OF THE PEOPLE OF THE GREAT LAKES REGION.

ONE OF THE CENTRAL RESEARCH CENTERS WHICH IS RESPONSIBLE FOR THE DETECTION AND TRACKING OF THESE HAZARDOUS SUBSTANCES IN GREAT LAKES WATERS IS THE EPA LARGE LAKES RESEARCH STATION AT GROSSE ILE, MICHIGAN. THE ADMINISTRATION HAS ATTEMPTED TO SHUT THE DOORS OF THIS IMPORTANT LABORATORY FOR YEARS BY INCLUDING NO FUNDING IN ITS BUDGETARY RECOMMENDATIONS TO CONGRESS. IN THE PAST, THIS SUBCOMMITTEE HAS WORKED WITH THE MICHIGAN CONGRESSIONAL DELEGATION, ESPECIALLY WITH THE

ASSISTANCE OF MY GOOD FRIEND AND FORMER COLLEAGUE, GOVERNOR JIM BLANCHARD, IN PROVIDING LEVELS OF FUNDING FOR THIS CRITICAL RESEARCH LABORATORY.

ON BEHALF OF THE MICHIGAN CONGRESSIONAL DELEGATION, I EXPRESS OUR GRATITUDE FOR HELPING TO ENSURE THAT THE LARGE LAKES LABORATORY IS ABLE TO CONTINUE ITS RESEARCH ON GREAT LAKES POLLUTION.

AS YOU ARE AWARE, THE ADMINISTRATION ONCE AGAIN HAS REQUESTED NO FUNDING FOR THE LARGE LAKES LABORATORY AND INDICATED THAT IT INTENDS TO PHASE OUT ITS OPERATION. IN THIS REGARD, I FAIL TO SEE WHY THE ADMINISTRATION IS INTENT ON CLOSING THE DOORS TO A RESEARCH LABORATORY WHICH HAS BEEN ATTEMPTING TO PROVIDE HARD SCIENTIFIC DATA ON GREAT LAKES POLLUTION. IT ALSO IS MY UNDERSTANDING THAT THE ADMINISTRATION HAS EXPRESSLY PROHIBITED THE LARGE LAKES LABORATORY FROM CONDUCTING DIOXIN RESEARCH. THIS IS UNCONSCIONABLE, PARTICULARLY AT A TIME WHEN LEVELS OF DIOXIN CONTAMINATION IN THE GREAT LAKES IS PROBABLY AT ITS HIGHEST LEVEL IN HISTORY.

MR. CHAIRMAN, THE APPROPRIATE COURSE OF ACTION IS CLEAR AND SIMPLE. GREAT LAKES POLLUTION RESEARCH MUST CONTINUE. AN APPROPRIATE LEVEL OF FUNDING FOR THE EPA LARGE LAKES LABORATORY MUST BE PROVIDED. THE FACILITY MUST BE GIVEN AUTHORITY AND FUNDING TO BEGIN CONDUCTING NEEDED RESEARCH ON DIOXIN LEVELS IN GREAT LAKES FISH. MY MARCH 9, 1983 LETTER TO YOU--WHICH WAS SIGNED BY THE ENTIRE MICHIGAN CONGRESSIONAL DELEGATION--REQUESTED THAT THE SUBCOMMITTEE PROVIDE A FUNDING LEVEL OF

$2.5 MILLION FOR THE CONTINUED RESEARCH OPERATION OF THE LARGE LAKES RESEARCH STATION. THIS REQUEST IS THE MINIMUM LEVEL REQUIRED TO MAINTAIN BASIC LARGE LAKES LABORATORY RESEARCH. IF THE LABORATORY IS DESIGNATED TO CONDUCT DIOXIN RESEARCH IN THE GREAT LAKES, A HIGHER LEVEL OF FUNDING WILL BE NECESSARY TO ENABLE THE LABORATORY TO PURCHASE THE NECESSARY EQUIPMENT.

IN CONJUNCTION WITH ANY FUTURE DIOXIN RESEARCH IN THE LARGE LAKES RESEARCH STATION, I SUBMIT FOR THE SUBCOMMITTEE'S CONSIDERATION A COPY OF A DIOXIN RESEARCH PROPOSAL PREPARED BY THE CRANBROOK INSTITUTE OF SCIENCE. CRANBROOK CONDUCTS RESEARCH WITH THE LARGE LAKES LABORATORY ON A CONTRACT ~~COMPACT~~ BASIS. I WOULD APPRECIATE YOUR SERIOUS CONSIDERATION OF THIS PROPOSAL.

IN CLOSING, I WANT TO COMMEND THE SUBCOMMITTEE FOR ITS DILIGENT WORK IN DEALING WITH THE PROBLEMS OF THE GREAT LAKES AND IN TAKING THE TIME TO EXAMINE THIS PROBLEM IN A CONSCIENTIOUS AND CONSTRUCTIVE MANNER.

DIOXIN CONTAMINATION IN MICHIGAN WATERS

Proposal for a Comprehensive Research Program
at the EPA Large Lakes Research Station (LLRS)
Grosse Ile, Michigan

Submitted by:

Cranbrook Institute of Science
500 Lone Pine Road
P.O. Box 801
Bloomfield Hills, Michigan 48013

April 4, 1983

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INTRODUCTION

The Cranbrook Institute of Science, in conjunction with the EPA Large Lakes Research Station at Grosse Ile, Michigan, proposes to conduct a three-year investigation of dioxin contamination in Michigan waters. This study would be funded and coordinated through the EPA/LLRS, and most of the analytical research would be carried out at that laboratory. Prerequisites of the study would include upgrading the laboratory facilities and staff, and modifying current research priorities.

While the main focus of this project is on specific problems of dioxin pollution in Michigan, it is also designed to provide investigative tools needed to address similar problems in all freshwater systems.

OBJECTIVES

The project will consist of two separate phases. The first and most urgent phase will involve a comprehensive river survey. The objectives are to:

Phase 1 -

- Verify and expand the data on dioxins in fish through targeted, composite sampling in 26 Michigan rivers and nearshore Saginaw Bay (Figure 1);
- Examine trends of dioxin loadings to the rivers through sediment profile analysis;
- Survey potential major sources of dioxin loadings to the rivers.

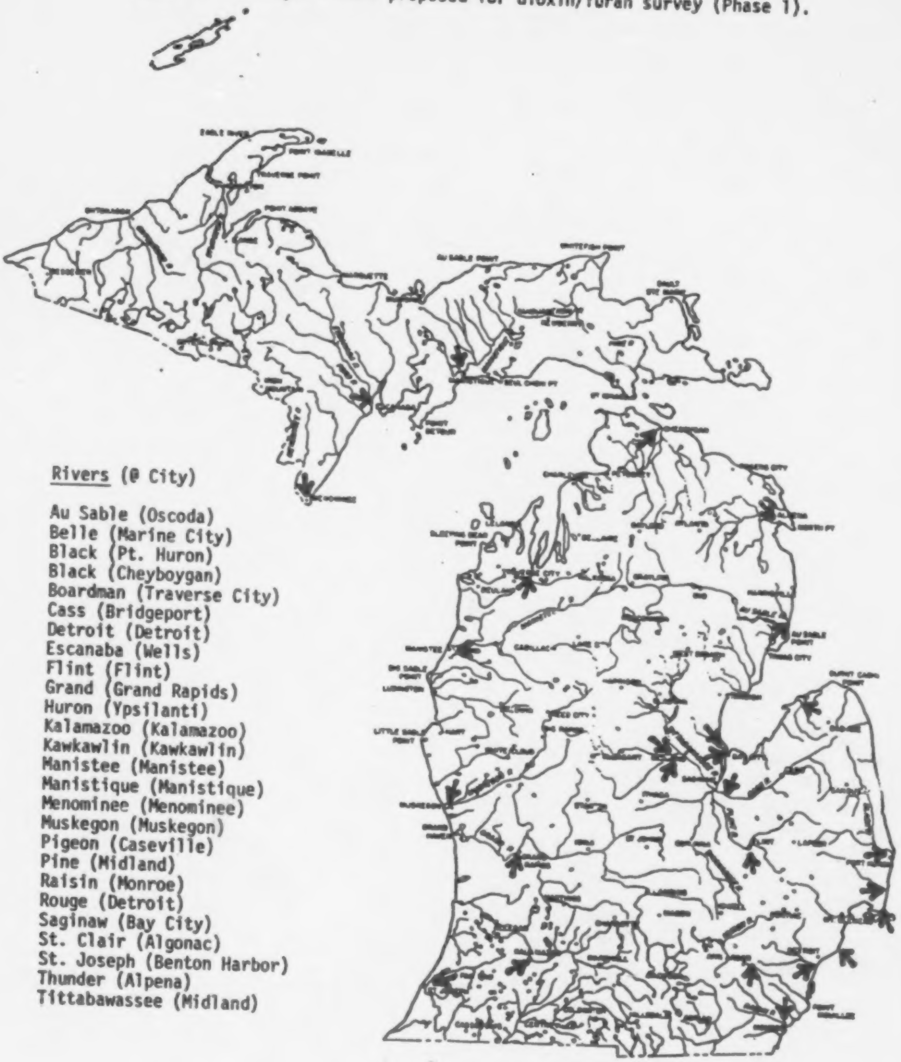
The sampling will bracket industrialized segments of the rivers where point sources of dioxins are more likely. This phase of the study will provide baseline data on levels of dioxin bioaccumulation in a variety of edible fish, on the variation of dioxin input rates over time, and on potential major routes of dioxin entry to river waters. The fish sampling will be planned and coordinated with the Michigan Department of Natural Resources (DNR).

The second phase of the project will be focused on dynamic aspects of dioxin pollution in the Tittabawassee and Saginaw Rivers, from the Midland area to Saginaw Bay (Figure 2). The objectives are to:

Phase 2 -

- Account for the quantity and rate of dioxin input to the river system;
- Describe its distribution and movement throughout the system;

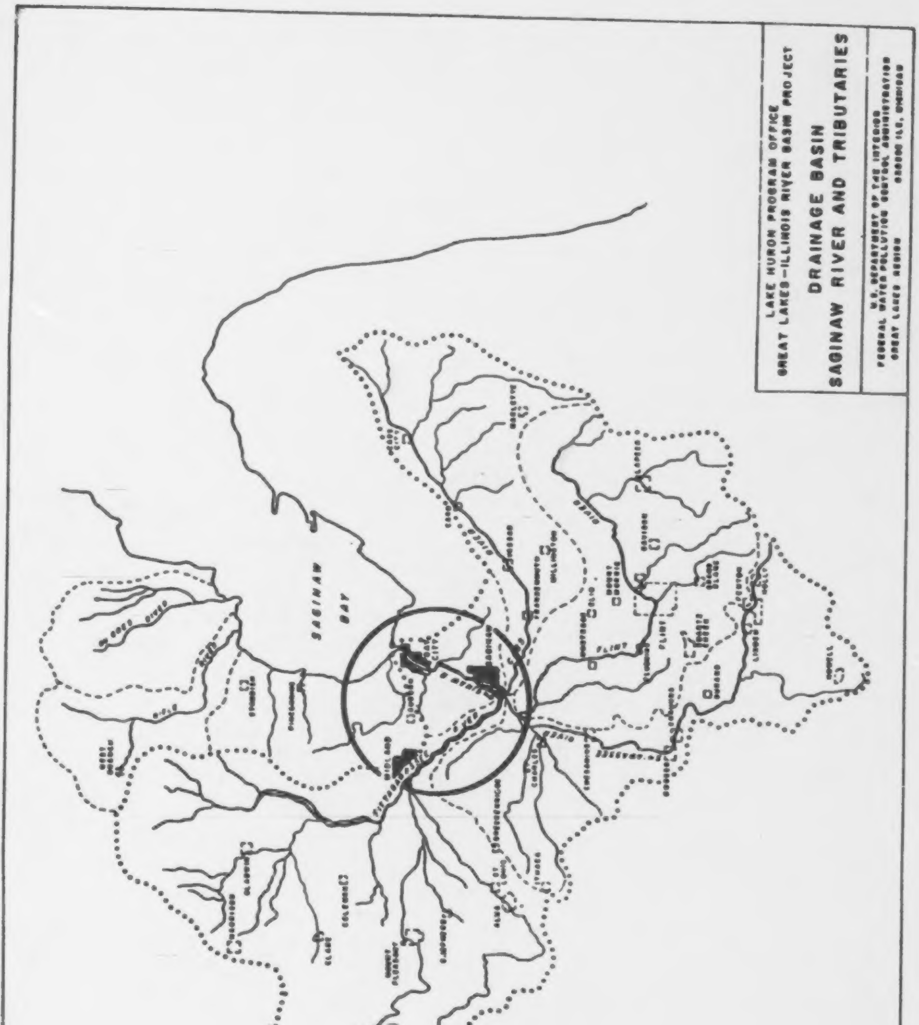
Figure 1. Michigan rivers proposed for dioxin/furan survey (Phase 1).



Rivers (@ City)

Au Sable (Oscoda)
Belle (Marine City)
Black (Pt. Huron)
Black (Cheyboygan)
Boardman (Traverse City)
Cass (Bridgeport)
Detroit (Detroit)
Escanaba (Wells)
Flint (Flint)
Grand (Grand Rapids)
Huron (Ypsilanti)
Kalamazoo (Kalamazoo)
Kawkawlin (Kawkawlin)
Manistee (Manistee)
Manistique (Manistique)
Menominee (Menominee)
Muskegon (Muskegon)
Pigeon (Caseville)
Pine (Midland)
Raisin (Monroe)
Rouge (Detroit)
Saginaw (Bay City)
St. Clair (Algonac)
St. Joseph (Benton Harbor)
Thunder (Alpena)
Tittabawassee (Midland)

Figure 2. Proposed intensive study area, Tittabawassee/Saginaw Rivers (Phase 2).


LAKE HURON PROGRAM OFFICE
GREAT LAKES—ILLINOIS RIVER BASIN PROJECT
DRAINAGE BASIN
SAGINAW RIVER AND TRIBUTARIES
U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
GREAT LAKES REGION
SAGINAW BAY
FLINT
LOCATION PLAN
SCALE IN MILES

- Determine its ultimate fate in sediments and fish in the rivers and Saginaw Bay.

- Project future dioxin levels.

This work will result in a mathematical "model" that is useful in predicting dioxin distribution, bioaccumulation and longevity in these and similar waters under a variety of future conditions.

RATIONALE

Polychlorinated dibenzo-p-dioxins (PCDD), commonly called dioxins, may be hazardous at extremely low concentrations in the environment. At these levels in complex mixtures of other contaminants, dioxins are difficult to measure reliably. Much of the limited data on dioxins in fresh waters are from analyses of individual fish or sediment samples. From these scattered measurements, average levels of contamination and distribution patterns are generally not apparent. Even less is known about the behavior and fate of dioxins introduced to rivers and lakes.

Dioxins in the Michigan environment were first reported in 1978 by the Dow Chemical Company. Among the isomers detected was 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), which is thought to be the most toxic man-made chemical known. The Michigan Department of Natural Resources has recently (March 10, 1983) summarized the limited Michigan data on dioxin contamination of soils, river sediments, Dow effluents, fish and sea gulls. Two other reports on dioxin were also released in March 1983 by Michigan State University and EPA, Region V. The former indicates a widespread though irregular distribution of dioxins in bottom fish (carp and suckers) from ten Michigan rivers, particularly the Saginaw River system. The EPA study reported 10-fold higher levels of dioxins in caged fish downstream from the Dow Chemical plant in Midland.

Although dioxins alone have received much recent attention, other contaminants of similar structure and toxicity have also been detected in Michigan fish by EPA laboratories at Duluth and Grosse Ile. These compounds include certain isomers of polychlorinated dibenzofurans (PCDF) and polychlorinated biphenyls (PCB). Any comprehensive survey of fish contaminants in Michigan should emphasize these toxins as well.

Cranbrook Institute of Science staff, working at the EPA/LLRS, have carried out studies of PCBs, toxaphene and other contaminants in the Great Lakes since 1977. This work included three years of intensive surveys of water, fish and sediments in the lower Saginaw River and Saginaw Bay. Much of the technical capability for dioxin and furan analysis already exists at the LLRS. However, no EPA laboratory in the country now has the facilities and expertise to carry out dioxin research on the scale necessary to address the Michigan problem. While considerable upgrading of equipment and staff at the LLRS would be necessary to analyze several hundred dioxin/furan samples per year, we believe this would be cost-effective. With these enhanced facilities and continuing support from grantee institutions, the LLRS could address a wide range of contaminant problems.

Currently, the EPA/LLRS, in collaboration with several grantee institutions and the Michigan DNR, is developing a research project designed to relate biological effects to toxin levels in Monroe Harbor (Raisin River), Michigan. Such an effects study would be a logical extension of Phase 2 in the dioxin project.

APPROACH

The timing and duration of various tasks under Phases 1 and 2 are shown in the Work Schedule (Figure 3). These tasks include progress reports and two evaluation workshops designed to provide initial peer reviews of results in Phases 1 and 2. We propose to collect and analyze 600-700 samples during each phase. The general approach to sampling will be as follows:

Sampling

Phase 1 -

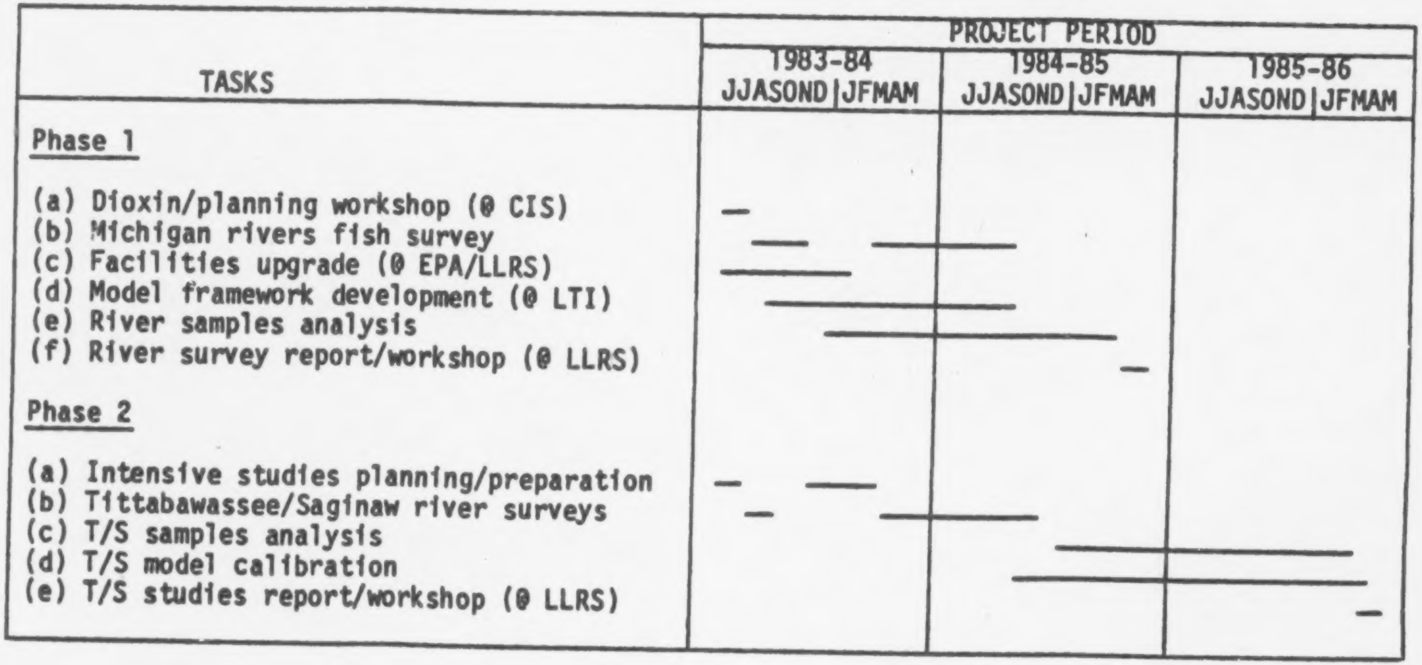
- Fish: 2-3 bottom fish and commercial or game species; 10 or more individuals per sample (composited by age class and species); 1 or 2 stations per river.
- Sediment profiles: Cores (2-3 composited); 5 upper layers sectioned at 1-2 cm intervals; screened for total PCBs prior to 3-layer dioxin analysis; 1-2 stations per river; Cs^{137} dating.
- Selected effluents: 1-2 wastewater discharges (composited) per river; major chemical/industrial discharges; storm water runoff at waste treatment plant intakes as available; agricultural runoff as available.

Phase 2 -

- Contaminant loading sources: 24-hr. composites of waste water treatment plant discharges (monthly); same for appropriate industrial effluents.
- Suspended solids: 24-hr. composites of river samples (monthly);
- Sediment profiles: Cores (1-2 composited); 5 upper layers sectioned at 1-2 cm intervals; screened for total PCBs prior to 3-layer dioxin analysis; Cs^{137} dating; approximately 50 stations in study area.

Collaboration with the Michigan DNR will be sought for fish and effluent sampling. Wastewater sampling will involve cooperation from municipal wastewater treatment plants.

Figure 3. Work schedule



Chemical Analysis

Due to the difficulty of low-level dioxin analysis, the analytical methods and quality controls used are extremely important. A crucial requirement of this work will be the use of high-resolution capillary gas chromatography (CGC) to separate dioxins from the complex mixtures of other contaminants that occur in all environmental samples. This technique is essential in matching unknowns with standards, and in resolving mixtures for confirmation analysis by mass spectroscopy. At the LLRS, high-resolution CGC has been refined specifically to analyze complex PCB and toxaphene mixtures.

The best available methods for dioxin and furan analysis will be selected based on a literature review and recommendations of the planning workshop during summer 1983.

Cause/Effect Analysis (Modeling)

A descriptive framework for modeling dioxins will be designed during Phase 1, based on a toxin fate model already developed for PCBs in the lower Saginaw River. This defines the connection between toxin levels in the source and receiving waters, in the sediments and in fish. It also provides a basis for describing the cause-and-effect relationships between dioxin loadings and biological effects. The ultimate goal of such modeling is to develop management options for protecting wildlife, and minimizing human exposure to toxins.

Once sufficient field data are available in Phase 2, the model can be used to address the following issues:

- Movement of dioxins through the system;
- Influence of dioxin input rates on concentrations in water, sediments and fish;
- Persistence and longevity of contamination;
- Effectiveness of remedial efforts;
- Rationale for fish consumption guidelines.

Quality Assurance

Quality assurance is a high priority and will be provided in part through inter-laboratory exchanges of samples and standards. Recently, the LLRS has participated with other laboratories in quality assurance studies sponsored by the International Joint Commission. Similar arrangements will be made with established dioxin researchers in the United States and Europe. Funds are budgeted for this purpose (Table 1).

PROJECT REQUIREMENTS

The proposed new equipment and staff (below) would substantially upgrade the capabilities of the LLRS for large-scale research on dioxins and other contaminants.

	Requirements		Approx. Costs*	
Activity	New Equipment	New Staff	Equipment	Staff
River Sampling	(Minimal)	-	$ 5,000	$ -
Sample Cleanup	4 HPLC[1] Instruments	2 Technicians	100,000	55,000
Sample Analysis	4 Cap. GC[2] Instruments	4 Technicians	120,000	105,000
Analysis Confirmation	2 GC/MS[3] Instruments	2 Analysts 2 Technicians	500,000	85,000 55,000
Data Mgt. & Analysis	1 Main Computer, 6 terminals[4]	-	150,000	-
Lab Renovation	1 dioxin[5] analysis lab	-	50,000	-
		Totals	$925,000	$300,000

Footnotes:
1. HPLC - High-pressure liquid chromatograph (Varian).
2. Cap. GC - Dual column capillary gas chromatograph (Varian).
3. GC/MS - Capillary GC and negative ion mass spectrometer (Finnigan).
4. VAX 11/780 and graphics terminals (Digital).
5. High-volume hood and facilities for handling dioxin.

*See also Budget, Table 1.

SUB-CONTRACT SUPPORT

Sub-contract funds are budgeted for two purposes:

- Inter-laboratory quality assurance studies (participants to be identified);
- Planning, data analysis and modeling, reports, and management recommendations based on results.

We propose that the latter support be provided in part by Limno-Tech, Inc. (LTI), Ann Arbor, Michigan. This consulting firm has extensive experience in the Saginaw River basin with research on toxicant problems (PCB, PBB, and DDT). Dr. Paul Rodgers of LTI has already developed toxics models specifically for the Saginaw and Pine Rivers, Michigan. The firm's staff has worked cooperatively with Cranbrook Institute of Science and the EPA Large Lakes Research Station on similar projects in the past.

BUDGET

The proposed budget (Table 1) shows the cost of new facilities and staff that would be required to conduct this dioxin project at Grosse Ile. We have assumed that present non-EPA staff, which now carry out the lab's analytical and data processing functions[1], would continue to be supported from the regular annual budget. The cost of this support is now approximately $500,000 per year for salaries, benefits and overhead. No other assumptions were made about the availability of regular extramural funds to support the dioxin project.

Cranbrook Institute of Science proposes to receive the entire funding as an EPA grant, through which equipment purchases, staff additions and subcontracts would be arranged as soon as possible.

Cranbrook is currently involved in toxins research conducted through the LLRS (EPA Cooperative Agreement CR810232).

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[1] Cranbrook Institute of Science and Computer Science Corporation

TABLE 1. ESTIMATED PROJECT COSTS (x $1,000)

	Budget Periods						Project Period	
	1983-84		1984-85		1985-86		1983-86	
	Total	EPA Share (95%)	Total	EPA Share (95%)	Total	EPA Share (95%)	Total	EPA Share (95%)
Sal. & Wages	275	261	300	285	330	313	905	860
Fringes (est. 20%)	55	52	60	57	66	63	181	172
Travel	10	10	12	11	18	17	40	38
Equipment	875	831	-	-	-	-	875	831
Supplies	20	19	24	23	26	25	70	66
Other[1]	135	128	95	90	240	228	470	446
Total Direct Costs	1,370	1,301	491	466	680	646	2,541	2,413
Indir. Costs[2] (Est. 36.5%)	476	453	152	144	168	160	796	757
TOTALS	1,846	1,754	643	610	848	806	3,337	3,170

[1] "Other" category detail:

		Est. Cost (x $1,000)
1983-84	- Lab renovation	$ 50
	- Modeling sub-contract	45
	- Quality assurance sub-contract	20
	- Planning workshop	20
		$135
1984-85	- Modeling sub-contract	35
	- Quality assurance sub-contract	40
	- Data evaluation workshop (Phase 1)	20
		$ 95
1985-86	- Modeling sub-contract	180
	- Quality assurance sub-contract	40
	- Data evaluation workshop (Phase 2)	20
		$240

[2] Currently proposed rate (EPA). Sub-contract costs not included in calculation.

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COMMITTEES:
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COMMITTEE ON ENERGY AND COMMERCE
CHAIRMAN
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS
OFFICE OF TECHNOLOGY ASSESSMENT
MIGRATORY BIRD CONSERVATION COMMISSION

March 9, 1983

The Honorable James H. Scheuer
Chairman
Subcommittee on Natural Resources,
Agriculture Research and Environment
Committee on Science and Technology
U. S. House of Representatives
Washington, D. C. 20515

Dear Mr. Chairman:

As you are aware, in its Fiscal Year 1984 budget, the Administration stated that the Environmental Protection Agency (EPA), "is not allocating any funds in 1984 for its research facility in Grosse Ile, Michigan, and is planning to close the facility at the end of 1983."

The closure of the Large Lakes Laboratory at Grosse Ile will terminate essential Great Lakes research in such areas as the circulation of toxic materials in the Great Lakes, the rate at which PCBs break down, and the effect of wave heights and water levels on shoreline erosion. Furthermore, elimination of the Grosse Ile facility will abdicate the United States responsibility in maintaining its treaty agreements with Canada to monitor water quality in the Great Lakes.

The importance of this facility cannot be overstated. The critical research activities undertaken by the Large Lakes Laboratory have contributed substantially to the scientific and technical understanding of the Great Lakes pollution problem. Examples of this research include:

1. A benchmark study of PCBs in over 4,200 fish of 24 species from Saginaw Bay, Lake Huron (1977-1981);

2. The first transport and fate model of PCBs in Saginaw Bay based on intensive surveys of water, particulate matter, sediments and biota (1977-1982);

3. The first comprehensive survey of PCBs and other trace contaminants in offshore waters of all the Great Lakes (1980-82);

4. A waste load allocation study of the Flint River (tributary to Saginaw Bay), as the basis of new EPA guidelines for regulating toxic metal loadings to rivers nationwide (1981-82), identified by EPA as one of 6 principal accomplishments of the agency during 1982;

5. Studies of organic contaminants in lake trout from Lake Superior and Isle Royale indicating atmospheric sources of toxaphene; data were used to support the recent toxaphene ban (1980-82).

Moreover, elimination of the Large Lakes Laboratory would terminate or interrupt several important ongoing research studies including:

1. The first synthesis and identification of all PCB isomers in environmental samples (1981-1983); important from the standpoint of identifying many unknown contaminants in Great Lakes and other samples;

2. An investigation of toxic transfer from polluted sediments to bottom-feeding fish and waterfowl; early results show hazardous levels of contaminants in Detroit River ducks;

3. The development of food chain models for predicting bioaccumulation of toxicants in Great Lakes game fish.

Despite the progress with regard to cleaning up pollution in the Great Lakes, there is much more work to be done. Recent research reports have indicated that unacceptable levels of dioxin have been found in certain species of fish in Great Lakes waters. Even more troubling are reports in recent days regarding EPA's findings of dioxin levels in fish existing in Michigan rivers. Furthermore, a 1982 General Accounting Office Report entitled, "A More Comprehensive Approach Is Needed To Clean Up The Great Lakes," concluded that EPA's own actions in not funding the Large Lakes Research Station raise questions about its willingness and ability to develop and carry out a comprehensive coordinated research effort in the future.

It is therefore imperative that the Large Lakes Research Station at Grosse Ile remain open and continue its critical research on Great Lakes pollution. For this reason, we request that when the Subcommittee considers legislation to authorize appropriations to the Office of Research and Development of EPA for Fiscal Year 1984, it specifically provide a funding level for the Large Lakes Laboratory at the Fiscal Year 1983 level of $2.5 million. Of this total, approximately $1 million should be authorized to support the EPA staff and the laboratory facility and $1.5 million to support extramural research programs.

Once again, we emphasize that the Large Lakes Laboratory at Grosse Ile is an integral part of overall research of the Great Lakes. Closure of the Large Lakes Laboratory would strike a severe blow to the productive and constructive research in the Great Lakes.

We appreciate your consideration of this matter.

With every good wish,

Sincerely yours,

Bob Traxler
Bob Traxler
Member of Congress

John D. Dingell
Member of Congress

Bob Carr
Bob Carr
Member of Congress

David E. Bonior
Member of Congress

Guy Vander Jagt
Guy Vander Jagt
Member of Congress

Bob Davis
Bob Davis
Member of Congress

John Conyers Jr.
Member of Congress

Carl Pursell
Carl Pursell
Member of Congress

Bill Broomfield
William S. Broomfield
Member of Congress

George C. Crockett, Jr.
Member of Congress

Howard Wolpe
Member of Congress

Dennis M. Hertel
Member of Congress

William D. Ford

William D. Ford
Member of Congress

Sander M. Levin
Member of Congress

Hal Sawyer

Harold S. Sawyer
Member of Congress

Mark D. Siljander
Member of Congress

Don Riegle

Donald W. Riegle, Jr.
U. S. Senator

Carl Levin

Carl Levin
U. S. Senator

Don Albosta

Donald J. Albosta
Member of Congress

Dale E. Kildee
Member of Congress

cc: The Honorable Don Fuqua, Chairman
Committee on Science and Technology

The Honorable Edward P. Boland, Chairman
Subcommittee on HUD-Independent Agencies
Committee on Appropriations

WAS

Mr. SCHEUER. Congressman Bob Traxler.

STATEMENT OF CONGRESSMAN BOB TRAXLER, STATE OF MICHIGAN

Mr. TRAXLER. Thank you, Mr. Chairman, and members of the subcommittee. Your subcommittee has been in the fore in the preservation of the Grosse Ile Laboratory, and as a member of the HUD Independent Agency Subcommittee of Appropriations, it has always been my pleasure to have noted the good work that this subcommittee has done by way of the authorization, and I, of course, am probably the only person in the room who lives on the Great Lakes. The water is 50 feet from my front door and occasionally approaches much closer than that.

As a person who lives on the Great Lakes, the Saginaw Base specifically and who not only fishes in those waters, but drinks those waters, the preservation of the Grosse Ile Laboratory is one of considerable interest, not only to my constituency, which surround the Saginaw Bay, but to me personally.

The laboratory, even though it has received support from the subcommittee and by way of appropriations unfortunately has not been viewed within the agency as something that is really worthwhile in deserving a preservation. I don't think that an administration or a Congress can abandon the Great Lakes to sort of shift for itself in times of incredible pressures that are being placed upon it through our chemical and agricultural, industrial, and human uses. By and large we are looking at an enclosed body of water, and the effects of contamination and pollution take years to correct.

As a result of the work of this Congress and prior administrations, a great success has been achieved in cleaning up the Great Lakes, and we are all proud of that record.

There are, however, more subtle and unseen dangers present now and indeed that we could expect in the future. We need the kinds of technicians, and incidentally, in the past and at the laboratory there have been eight full time personnel there plus several part time. In addition, they have done substantial contracting out of responsibilities and studies.

I regret to advise you that of the $2.5 million that you authorized last year and that was appropriated, over $1 million of that has been diverted and sent elsewhere by the agency in direct contradiction, I believe, to the specific recommendation although not law—specific recommendation of the Congress that the Grosse Ile Laboratory be maintained as an important research facility on the Great Lakes.

Some of that money went to Duluth. Duluth has no interest in Great Lakes research, as strange as that seems, but it is true.

We were told, as you recall, last year by the agency that in winding down the research at Grosse Ile they would pick up Great Lakes research at Duluth, and that is not the case.

Additionally, they have returned a substantial portion of the million dollars to headquarters here in Washington, D.C., for what purposes I am not certain about, but I think it is important that we know that your good efforts and those of the Preparations Committee sometimes go for naught in view of the kind of lack of strong commitment on the part of the Agency toward the Great Lakes research.

How more specific you can be, I am not certain, Mr. Chairman, in directing the Agency to do specific things. I think it is unfortunate when the Congress has to specifically in great detail spell out in the law what an agency must do. I have to say to you that at this point I have very, very little confidence in the agency. I hope for the best; I want the new Administrator to do his job properly, but as of now there is no specific proposal within the Agency to deal with, what I consider to be, very serious toxic chemical problems.

It is incumbent upon the Congress, therefore, to design it now and get it started now, because we are looking at several years of scientific effort.

Mr. SCHEUER. Well, I just couldn't agree with you more, and I share your concerns, and I share your concern about the effectiveness of the whole institutional apparatus by which we are dealing with this problem.

I think you know, and I think the records had showed that we did put in a line item pertaining to this Great Lakes research. As you know, the bill was vetoed. There never was an authorization bill last year. There was an appropriation bill.

Perhaps you and Chairman Boland working on that committee can assure a fallback position in the event that the same thing happens this year, and I profoundly hope that under Mr. Ruckelshaus's new leadership that it will not happen.

But, we certainly will do everything we can to put a line item in again this year. I hope there will be some kind of a fallback position with a line item in the appropriations bill.

Mr. TRAXLER. Mr. Chairman, I discussed this with Mr. Boland, and he still has this matter under consideration—the point that you have just made. He, like I think, many of us are reluctant to line item research matters. We would like to believe that the agencies are acting with good intentions, and that they are going to respond to very clear needs on the part of the citizenary of this Nation of ours.

I hope that would be the case. We want the new administrator to do well. Many of us have a lot of trust and confidence in him. We know it is going to take time for him to get a handle on this.

It may be that your suggestion, at least for the in term, is one that we will have to utilize.

Mr. SCHEUER. Let me throw out one question that I would like all of you to think about, and especially Governor Blanchard who has departed these precincts and who can perhaps can take a more objective, distant view from the top of the mountain place somewhere.

Looking at our Government institutions for dealing with toxic substances, looking at the fact that Dow Chemical knew about the seriousness of dioxin two decades ago, that our Government has known about it for many years, here we are with anywhere from 15,000 to 50,000 toxic wastes in our country, depending on whose estimate you select.

We don't seem to be catching up. The performance under Superfund has been absolutely pitiful in terms of the numbers. You are talking about a pitiful handful of toxic dumps that have been adequately treated.

In addition to better funding, and in addition to perhaps better leadership over there at EPA, and we hope that Mr. Ruckelshaus will provide that, are there any other institutional changes you think we need to do the job? Are we demanding too high a level of proof of toxicity? Industry says we don't know enough to regulate dioxin and to regulate acid rain.

At the same time, they have reduced energy research—research into how we can use 500 years of coal beneath the surface of the earth without environmental degradation of our health and our environment.

So, we have a sort of a catch-22 situation there. We don't do enough, but both industry and Government and the administration; we don't know enough, they say, but they seem to be determined that we never will know enough.

Do we have to lessen the burden of proof? They say there is no linearity that can be proven. There is not a 100-percent cause and effect relationship between spewing dioxin in the effluent and the discharge of the Dow plant into the Tittabawassee River and polluting effects elsewhere.

They say there isn't sufficient linearity between a given reduction in polluting effects in the Ohio River Valley and a reduction in pollution in the east coast of the United States and perhaps in the east coast of Canada as well.

I suppose they are right. There isn't 100 percent linearity. What happens when those sulfur dioxides go up in the air—the incredibly complicated process of transport where they carry hundreds and perhaps even thousands of miles—the directions they go—the transformations that take place during transport—the time and place and form in which these sulfur dioxides come back to earth all seem to defy precise scientific analysis.

We don't know enough. Certainly, we don't know everything, and if we continue a form of regulation, a regulatory law and procedure that says we have to know everything before we can do anything, are we faced with a institutionally imposed catch-22? Are some basic changes in the process in the way in which we approach this, in the level of corporate responsibility urgently needed? It has been frequently said that in life the only thing more difficult than to seize an opportunity is to forego an advantage.

Do we have the hope that corporate officialdom—the CEO's of the great chemical companies—is operating under laws that never contemplated toxic substances of the incredible toxicity of dioxin?

Do we have the hope that laws that are passed for the whole generality of chemicals and to provide all kinds of loopholes and delaying factors—the legal system itself which provides promotion practice, which is itself intrinsically delaying?

Appeals and rehearings and what not—do we have a hope that corporate executives who have the life and death responsibility of producing and selling a substance like dioxin will exercise some restraint and perhaps not invoke every last advantage that a legal system allows them?

I am going to call upon Congressman—Bob, had you finished. Let me yield back, and then I am going to call on Congressman Don Albosta, and then I will ask anyone of you and hopefully Governor Blanchard with a little more objectivity having been away from us for almost 6 months.

Perhaps you can shed some light on the committee's intent to look into the basic institutional structure by which our society hopes to cope with the problem of the explosion of toxic chemicals which our incredibly creative and ingenious chemical industry is producing much to the benefit of mankind, but with these incredibly legal implications.

Bob, let me yield back to you, and then I'll yield to Don, and then I hope that some of you will give us a little brainstorming session.

Mr. **Traxler.** In conclusion, Mr. Chairman, I want to again join with the Governor, and Mr. Dingell, and Mr. Albosta in urging the subcommittee to authorize the Grosse Ile Laboratory. I think the committee should be aware that within a matter of a couple of years ago, there were eight full-time employees at the laboratory, two part-time employees, two other full-time employees, four temporary—that is co-op, and additionally there were 30 onsite contracted out personnel.

We have come down to one full-time personnel—the director—and the director who has been there for many years has resigned out of disgust for this situation, and we have one technician in support of the laboratory.

That is now exactly what we have in spite of the best efforts of the Governor, Mr. Dingell, whose district the lab is in, and myself and others to insure its survivability and viability.

So, it is going to require major effort. I want to thank the subcommittee for its patience.

Mr. **Scheuer.** Well, we appreciate your testimony, and I assure you that this subcommittee will work with you. That is a truly pitiful shameful situation, and it's really terribly discouraging.

We will bend every effort to work with you and the chairman of the Energy and Commerce Committee to see what we can do to maintain and restore and even improve the viability and effectiveness of that research facility.

You can count on our very positive efforts.

Congressman Don Albosta.

STATEMENT OF CONGRESSMAN DON ALBOSTA, STATE OF MICHIGAN

Mr. **Albosta.** Thank you, Mr. Chairman. I would ask unanimous consent that my entire statement be entered into the record at this point, and I will read, Mr. Chairman, just from parts of it.

Mr. Chairman and members of the Subcommittee on Natural Resources, Agricultural Research and Environment, I am pleased to join our distinguished Governor of Michigan, Jim Blanchard, and my fine colleagues John Dingell and Bob Traxler in support of increased funding in fiscal year 1984 for the Environmental Protection Agency's research and testing of dioxin in Michigan and around the country.

As you know, Mr. Chairman, I represent the city of Midland, the home of the Dow Chemical Co. and the site of the dioxin controversy in Michigan.

Since the information became public about potential dioxin contamination in the Midland area and possibly in other parts of Michigan, I have been actively involved in seeking answers to the many questions raised by the public. We must get to the bottom of the dioxin controversy to find out what types of dioxins are harmful and in what amounts in our environment.

A national standard for dioxin must be issued so that residents of Midland and the rest of the country will know what levels of exposure are safe for humans.

To achieve these objectives, however, will take money and time. During the past month I have held numerous meetings with Federal, State, and local officials to determine what tests are necessary, how they should be completed, and what costs are involved.

Building on a commitment I received from former EPA Administrator John Hernandez, the current EPA region 5 Administrator Val Adamkus has taken the lead in working with top officials from the Michigan Department of Natural Resources, the Department of Public Health, the Governor, and the Attorney General to come up with a workable testing plan for dioxin in Michigan and in other parts of the country.

The estimated cost for the dioxin tests and studies will be $6 million in fiscal year 1984. Testing is slated to begin as early as this August.

As a member of the Subcommittee on Water Resources of the House Public Works and Transportation Committee, I will also be working in the coming weeks to include the necessary authorization and direction for the EPA to use funds under the Clean Water Act to assist in the dioxin project.

This project must be a priority of the 98th Congress. By working together we can see that the necessary resources are made available to EPA to get the job done.

Before closing, I would like to add what I believe is the most important ingredient that must be part of the EPA dioxin study. What we need is a creation of a blue ribbon committee made up of topnotch independent scientists to review the EPA study design and the results to make sure they are accurate.

The blue ribbon committee will help restore the EPA's badly tarnished credibility and lend credibility to the Agency's work on dioxin so that the public will have confidence in the final results.

Again, I appreciate the opportunity to appear before this subcommittee this morning and I will be glad to answer any questions.

[The prepared statement of Congressman Albosta follows:]

STATEMENT OF REP. DON ALBOSTA
before the
SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURAL RESEARCH AND ENVIRONMENT

April 19, 1983

Mr. Chairman, Members of the Subcommittee on Natural Resources, Agricultural Research and Environment, I am pleased to join our distinguished Governor of Michigan, Jim Blanchard, and my fine colleagues John Dingell and Bob Traxler in support of increased funding in Fiscal Year 1984 for the Environmental Protection Agency's research and testing of dioxin in Michigan and around the country.

As you know Mr. Chairman, I represent the City of Midland, the home of Dow Chemical and the site of the dioxin controversy in Michigan. Since the information became public about potential dioxin contamination in the Midland area and possibly in other parts of Michigan, I have been actively involved in getting answers to the many questions raised by the public. We must get to the bottom of the dioxin controversy to find out what types of dioxins are harmful, and in what amounts in our environment. A national standard for dioxin must be issued so that residents of Midland and the rest of the country will know what levels of exposure are safe for humans.

To achieve these objectives however, it will take money and time. During the past month I have held numerous meetings with Federal, state and local officials to determine what tests are necessary, how they should be completed and what costs would be involved. Building on a commitment I received from former EPA Administrator John Hernandez, the current EPA Region 5 Administrator Val Adamkus has taken the lead in working with top officials from the Michigan Department of Natural Resources, the Department of Public Health, the Governor and the Attorney General to come up with a workable testing plan for dioxin in Michigan and in other parts of the country. The estimated cost for the dioxin tests and studies will be $6 million in Fiscal Year 1984. Testing is slated to begin as early as this August in Michigan.

Dioxin testing is also being planned by EPA for other industrial and non-industrial areas of the country, to determine what sources of dioxin are in the environment. Out of these tests, I believe EPA in cooperation with Federal health agencies, will be able to set national standards for the safe regulation of dioxin.

Strong authorization language by this Subcommittee will help insure that funds are appropriated and used properly by EPA to gain some answers to the dioxin puzzle for the people of Michigan and the entire country. This afternoon I will be testifying before the House Appropriations Committee, again in strong support of funds for EPA to carry out their dioxin testing plan in Fiscal Year 1984. I can only echo my other Colleagues and the Governor's statements in support of adequate funding for these vital EPA research and testing programs to help insure the health and safety of the American people.

As a Member of the Subcommittee on Water Resources of the House Public Works and Transportation Committee, I will also be working in the coming weeks to include the necessary authorization and direction for the EPA to use funds under the Clean Water Act to assist in the dioxin project. This project must be a priority of the 98th Congress. By working together we can see that the necessary resources are made available to EPA to get the job done.

Before closing, I would like to add what I believe is one important ingredient that must be part of the EPA dioxin study. That is, the creation of a Blue Ribbon Committee made up of top notch independent scientists to review the EPA study design and the results to make sure they are accurate. The Blue Ribbon Committee will help restore the EPA's badly tarnished credibility and lend credibility to the agency's work on dioxin so that the public will have confidence in the final results.

Again, I appreciate the opportunity to appear before this Subcommittee this morning and I will be glad to answer any questions.

Mr. **Scheuer**. I appreciate your comments. We are doing exactly what you suggested. At least that will be one part of our reappraisal of the whole condition of research.

I suppose the best research facility in the world in dioxin, on the whole subject of dioxin, resides in the Dow Chemical Co. Instead of stultifying and suppressing Government research to prevent Government from being able to protect our health and environment by knowing as much as they need to know to regulate it, is there another way?

Would it be too vain a hope to express the hope that Dow Chemical, as a matter of public policy, would make available to the Government its findings and enable its scientists to join in some kind of a cooperative effort with EPA scientists and perhaps scientists from HSS, from the National Institutes of Health, from the Center for Disease Control, the Food and Drug Administration, from the National Academy of Sciences, from the National Science Foundation, perhaps the AAAS [the American Association for the Advancement of Science], is it too much to hope that Government could be part of the solution instead of being part of the problem?

Mr. **Albosta**. Mr. Chairman, if I might——

Mr. **Scheuer**. To this day, as I understand it, the Dow Chemical Co. is still fighting the efforts of Government to examine the effluent coming out of its Midland plant which is pouring into the Tittabawassee River. They are fighting the efforts of the Government to create the kind of knowledge base upon which we and Congress could act and upon which the EPA and other health and environment agencies could act.

Could the four of you give us some advice on how we cope with this problem? It seems to be well beyond the means of the Federal personnel and the Federal institutions designed to deal with it, the law as it now exists.

How do we include the expertise and the brilliance and the creativity of the chemical companies—Dow specifically, into finding a solution to the problem?

Mr. **Albosta**. Mr. Chairman, if I might say this, there are more and more presidents, there are all kinds of them all over, but this is the main person for the United States. The Dow Chemical Co. president has assured me, at least in principle, that Dow Chemical Co. will agree to allow scientists from EPA or private scientists to review their records.

There are certain things within Dow Chemical Co. that they believe should not be made public, so there may be some things that they would ask that would be made confidential, so that their competition would not be able to steal the results of much research that they have done.

I would hope that they would live up to that agreement. I think it is very important, as you have stated to this whole issue, if we are not able to do that it is going to be much more costly to the Nation and in the end results we will find it out and we will know all of the results that Dow has on the records now anyway.

My hope would be in our study and the protocol established for that study by EPA, that they would be able to include all of their scientific data to date to be able to pull it from the records of Dow Chemical Co. and research it with their scientists and find out what yet is needed that we do not now know that are in the files of Dow Chemical.

So, I think that it is very important to this issue, and the Governor has stated and Congressmen Traxler and Dingell both have stated that there is more than the issue of dioxin. Furons are almost as toxic as dioxin, so I think we are going to try——

Mr. SCHEUER. As dioxin?

Mr. ALBOSTA. As dioxin, yes. But that is the point that we have to get to. We need very badly to be able to determine what all kinds of toxic substances are in existence and what we might be able to deal with or alleviate the environment.

Mr. SCHEUER. Governor Blanchard.

Governor BLANCHARD. I would like to add a couple of things. First, with regard to getting the information in the hands of corporate America, I think, Chairman Dingell probably has some fairly knowledgeable viewpoint on it. I know the attorney general of Michigan, if you would like us to make him available to you, can give you a pretty good summary of how they go about getting information and what the problems are, and that gets into enforcement, as well as research.

Your idea of getting information I think is important, but my experience in serving 8 years in Congress and now briefly as Governor and as a private citizen, I just don't think you can rely on corporate America to be doing the kind of research we need.

They are always going to put their best foot forward, rightly so, they are always going to try to put the best face on whatever problems they have from their point of view, and I think generally their decisions are every bit as short-term oriented or more—that is, quarterly profits.

As anything done in this town, which we have often criticized for being too short-term oriented with 2-year terms, which are still longer as I am measuring one quarterly profit to another.

We are going to have to have substantial, publicly funded research on environmental questions, including toxic chemicals.

Most of these issues are national in scope. They cannot be delegated in some sort of convoluted New Federalism to 50 States that don't have the resources, and if they do they shouldn't be duplicated because we have limited financial resources.

It is a problem that is going to plague us for the rest of our lives and for generations to come even if we stopped this very day producing modern products, because it is simply a byproduct of our civilization.

We can discuss how to get information from the business community which produces these. I don't think it is going to be a substitute for our own research and research design and for an ongoing program.

You ask me institutionally how I see all of this, having been out of Congress for 3 months in another role. I don't know that I have been in the other role long enough to have any additional insights to what you would make on the problem.

I would say that it strikes me that if we simply follow up on the laws we have already enacted, in fact, most of which were enacted before I came to Congress, follow up on those laws and adequately funded research that has been provided for by law and adequately fund enforcement and cleanup legislation and not have to come in here 5 years in a row fighting to keep a lab open, the importance of which is so basic to mankind no one should have to waste their time doing it.

Then we find out that even though we have specified they should keep the lab open and provided the funds, they have circumvented our instructions, our wishes, and sabotaged the will of Congress.

I might add that while it wasn't as severe, we had a problem with the previous administration as well, so I want to make sure—the Republicans on this committee have been most helpful on Great Lakes matters—I want to make sure that I specify this has not been a partisan problem.

But it is a serious problem that you can help us with. I think we have just got to follow up on what we have enacted into the law. We have got to fund these programs. We cannot have on-again, off-again facilities and programs.

There is a lab in North Carolina which has been completely shut down, but I am advised by technical people in Michigan that we ought to support that laboratory getting cranked back up as well.

I hate to think what is going on in other programs, if they do what they have done to this large lake lab behind our back.

Mr. **Scheuer**. Mr. McGrath.

STATEMENT OF CONGRESSMAN RAYMOND McGRATH, STATE OF NEW YORK

Mr. **McGrath**. First, let me thank the gentleman from Michigan for making a very impressive statement regarding the laboratory in their State and let me assure them that I will work with the Members of Congress and certainly the Governor to work out some reasonable solution to this problem.

I have a particular problem. I have no problem institutionally with providing money for R&D purposes, financed by the Government. I think that is a basic responsibility of the Government.

But I have problems with after all of the money is spent and in some cases elaborate and extensive R&D has been done into some of these toxic wastes, toxic chemicals, that the scientists themselves are reluctant to even recommend a standard.

Don, you asked for a national standard on dioxin. After all of the studies, if we ever have any studies on the effects of dioxin, I can assure you that most scientists will be reticent to recommend to the Congress to put in statutes a standard for dioxin.

Therein lies the problem, I believe. How can you ask a chemical company or any company to not use, not produce a toxic chemical when there is no standard? There will be no standard. When the Government takes them to court through some sort of enforcement effort, it will be thrown out because there is no standard.

We are caught in the consummate catch-22 situation. I would hope that standards can be established, that during this research somehow some risk analysis can be done. I just lit a match here and smoked a cigar. I wonder how much dioxin I created for myself and for others in this room by doing that, as it relates to, compared to vis-a-vis, maybe some of the dioxin that is being emitted into the water in Michigan.

I think those kinds of things are absolutely necessary, and I don't think it is happening in the type of research that we do.

Mr. **Albosta**. I think that what we can inject into your question or your statement, I think that what we would have coming from this study would be a standard. That should be the goal of the study. We have no standards as you said, and this goal of our study ought to be to establish that standard. What is needed to stop the controversy, the long-term controversy for the next 15 or 20 years perhaps, is a panel of scientists that review the protocol, so that when EPA comes up with this standard everything has been done to that point in time in agreement with the scientific community.

If it is done in agreement with the scientific community, the end results of it can be reviewed by them, but nobody is going to be able to challenge that very study, and that standard comes from that study by the public agency.

That is what we have to do.

Mr. McGrath. I can assure you that we have had scientists in here on every aspect, not only EPA, but energy and this afternoon—they don't want to give us a standard.

Who is liable if they establish a standard or recommend a standard that Congress put into some statute? They are not going to do it. They haven't done it. They sit there in front of us and tell us how dangerous some of these things are, but will not come out with a concrete statement as to how many parts per billion, or you know, whatever it might be.

What is the standard? No standard. You can't do it.

Mr. Dingell. I think an observation can be made here and that is we have had an explosion of knowledge and technology, and we also have had an explosion of information with regard to the cuts of the use of the knowledge and the substances and the products which are created, both as basic products and as waste products.

I don't think that—I think the one thing that Congress is going to have to learn is that we are going to have continued scares on dioxins and other things as we go forward.

We are going to find new perils and new opportunities and new difficulties. Our laws are written in a very curious fashion. We have written laws which, in some particulars, are not adequate in the sense that they don't work or they don't deal with the problems, or they don't provide sufficient teeth.

In other instances, we are dealing with laws that have teeth that make the law essentially, literally unworkable because it is true Draconian. We have laws on toxic emissions into the air. They don't work. There is no way that EPA can make those particular sections of the law work.

That is one thing we found last year when we did our review of the Clean Air Act, something along the lines that you have been discussing where we actually reviewed the risk and ascertained what should be done to deal with it is a very good course.

As our Governor has said, we have got to enforce the law as it is written. We have got to review the law as it is written very carefully to see to it that it continues to work. That is a very valuable function of legislative oversight—it goes much beyond looking to see whether we ought to fire so and so because they are having contact with this company or because of some private picadillo in public undertaking.

I will tell you that those are important things, but what really is important is that we review the law to see to it that it in fact works and does things that we want to have it do.

One of the basic problems we have got is that we don't have a system which essentially functions to clean up the mess. I once sat down when I was working a lot on water pollution and came up with basically a self-enforcing water pollution law.

That was that you just simply put your out fall-up stream with your intake, and you will be pretty careful about what you let go.

But, these things are something which are going to take a long time to get corrected. Your problem on dioxin is a very good one. What you do—Congress should never write a standard and say we're going to allow *x* parts per million of dioxin. That may be far too much or it may be far too little.

It may be that we ought to say "No," that dioxin won't take it, and in doing this thing of writing basic regulatory statutes that Congress should write a statue which says "OK fellows, we are going to have standards fixed on the basis of the information that is available as to peril and to get as close to that level of emissions which assures protection of the health and environment as you can get."

Then, turn it over to EPA and watch them very closely to see to it that they do that which they are supposed to do.

Understanding that the information and pollutants are going to continue to grow on us, we are going to have to review these problems as they go forward. One of the basic things, and I sit on OTA [the Office of Technology and Assessments] is to try and understand where we are going.

OTA has come up with the idea that with regard to hazardous emissions and toxic substances that we ought to take steps to convert them from peril—to possibly an asset by finding uses for the substances or to see to it that they don't get into the environment by series of catalies and charges.

It is very clear that CERCLA and RECRA, the two statutes that deal with these matters, are not going to clean up your hazardous waste dumps, are not going to clean up ours in Michigan or anywhere else.

What we have to do is to see to it that we not only increase the amount of moneys that are actually available to clean up but that we stop emitting these substances into the environment in different ways. If we don't, we are going to find out when RECRA and CERCLA come up for review in about another year to 3 years that we are going to be further behind than we were when we started out with the statute.

[The prepared statement of Congressman McGrath follows:]

THE HONORABLE RAYMOND J. MCGRATH, EPA AUTHORIZATION HEARING—APRIL 19, 1983

Mr. Chairman, I want to join you in welcoming our distinguished witnesses here this morning.

In addition to our other witnesses, the State of Michigan seems to be quite well represented here this morning, and I look forward to hearing their views on the EPA budget as it affects their State.

I am pleased that we also have before us this morning witnesses who are knowledgeable in the area of solid waste disposal.

As you may be aware, in my congressional district in Long Island, New York, we have a resource recovery plant which has been closed for the past few years. The Hempstead Resource Recovery was closed because of both labor difficulties and because it was emitting dioxin.

I will be pleased to hear the comments regarding the problems of this plant, and of this type also the views as to what kind of a standard for dioxin emissions from facilities of this type could be established.

Once again, welcome, and I look forward to your testimony.

(You may want to add that there is a full committee markup going on down the hall and you will be going back and forth.)

Mr. SCHEUER. All right, this has been a very thoughtful and stimulating session. We are absolutely committed to continue your research facility, and Bob will be in touch with you and your chairman and work with you diligently in whatever way seems most productive.

Mr. DINGELL. We will be in touch.

Mr. SCHEUER. I want to thank the Governor of Michigan for honoring us with his presence. We enjoyed it, and we benefited. Thank you very much.

All right, we will now call Dr. Edward Ferrand, assistant commissioner for science and technology, New York City Department of Environmental Protection.

Is Dr. Ferrand here? All right, then, we will move on to panel No. 3. Mr. Norman Nosenchuck, Association of State and Territorial Solid Waste Management Officials; Mr. Randolph Wood, State and Territorial Air Pollution Program Administrators; and Mr. Leo Weaver, Association of State and Interstate Water Pollution Control Administrators.

All right. Let's go from right to left. We will hear from Dr. Randolph Wood first. Let me say for all of you that your prepared statements will be printed in full at this point in the record. Perhaps you could just chat with us informally for 7 or 8 minutes and then after the three of you have testified I am sure we will have some questions for you.

STATEMENT OF DR. RANDOLPH WOOD, STATE AND TERRITORIAL AIR POLLUTION PROGRAM ADMINISTRATORS, WASHINGTON, D.C.

Dr. WOOD. Thank you Mr. Chairman. As indicated, I am Randolph Wood. I am administrator of the Air Quality Division of the Wyoming Department of Environmental Quality, and I am appearing here on behalf of the staff of the State and Territorial Air Pollution Control Program Administrators. I am president of that body.

Since my prepared statement will be included in total in the record, I will, at this time, simply summarize it for you and answer any questions that you might have.

First, I would like to thank the subcommittee for interest in the thoughts of the professionals around the country who are responsible for control of and working with air pollution sources in the States.

As has been discussed already by this subcommittee and the previous panel, basic research into air pollutants and air pollution sources is a point of very high concern with the States.

We can reflect upon the past 12 to 15 years and see where air pollution control has come over that timeframe. The original statutes were not command and control statutes; they were structured guidelines. They simply did not work.

EPA and the previous agency did not, during that timeframe, do much in the way of basic research and development. The research and development that EPA has conducted over the past 7, 8, or 9 years has been extremely important to the States, the public, and industry. We are dismayed at this point in time to see the research budget for EPA reduced both in terms of real dollars and in terms of actual dollars.

We are convinced that to look to the short-term, and to reduce the research budget to the point where we are unable to look down the road and prepare for those future questions is inappropriate. Without the long-term research that is absolutely necessary to establish standards, protect the public health and welfare, and develop control technology we are going to be trying to address tomorrow's problems with yesterday's knowledge.

That is simply inconsistent with good public policy.

In my written statement I dwell on three different programs. First hazardous air pollutants have been discussed in detail by the previous panel. I am talking about hazardous air pollutants as a generic class rather than concentrating on dioxins or furans or some of the more toxic pollutants.

Hazardous air pollutants represent an area of major concerns to the State. You should be well aware of the list of some 37 prominent hazardous air pollutants which has been discussed by EPA and by Congress over the past number of years.

We are all waiting today for information and action that should have taken place 3 years ago. Nothing has been done to date, and there is nothing visible on the horizon with respect to these 37 air pollutants that are considered by the health community to be hazardous.

Given the lack of visible progress to date. I am satisfied that with a reduced EPA budget, we are not going to see any progress in that area over the next 2 to 3 years; much less in 1984.

It is also important for you to know that in the absence of EPA action in this very important area, the States themselves are being forced into developing programs of their own, in an attempt to address this problem.

Late last summer, the State of Wyoming received an application for a permit for a synthetic fuel plant—a $2 billion coal to gasoline plant. We experienced public concern over the potential hazardous air pollutants, many of which were on the list of 37, and many of which have never been considered by the State before.

The air quality division of the State of Wyoming, with a total staff of 21 had to try to deal with that problem. We had to try to develop acceptable levels of air pollutants for those pollutants.

It is a process which we are simply not staffed to address. It is a process that——

Mr. SCHEUER. You say we.

Dr. WOOD. The State of Wyoming and the States in general. Very, very few States have staff that is capable of performing the epidemiological research, and to do the other types of analyses necessary to address hazardous air pollutants.

It is extremely important that EPA have a research and development budget which is sufficient to provide us with that kind of information.

My review of their budget request for research and development for fiscal year 1984 simply tells me that that is not the case.

There are two or three other areas of research and development out of the hazardous area, that I would like to touch just briefly. As you are probably well aware, every time a permit application comes to a State or EPA, an analysis using dispersion models is conducted to determine the impact of the emissions of that pollutant.

Everyone agrees that dispersion models provide us with an educated guess—an approximation—of what is going on. There are shortcomings. The States, as well as EPA, need for these tools to be improved significantly.

We need to be looking at complex terrain. We need to be looking at long-range transport. And visibility impacts. Based upon my review of this EPA budget, I am convinced that none of those kinds of developments in models are going to take place.

With a reduced budget, we are going to be sitting here in 1985 and 1990 with the same tools that we had in 1980, and trying to do a job that is that much more difficult.

I would disagree with one of the concepts that EPA has presented to you regarding the development of control technology. EPA is proposing to virtually phase out all of the funding in its research and development program for the development for control technology.

I would submit to you that in the past the public moneys spent to develop control technology has benefited the public. It has been cost effective for respect to industry and it has been cost effective for the total public.

There are numerous control technology developments which have taken place over the past number of years which simply would not have taken place had it not been for EPA research.

Private industry and corporations are simply not going to pick up that slack. They are not going to continue to develop improved control technology to the extent of EPA's research and development program.

I would urge you to look at that particular proposal and provide continue funding for control/technology R&D.

EPA has highlighted its increased funding in research and development programs for scientific assessment—ostensibly of existing information—in order to strengthen the scientific basic for the establishment of standards.

I would submit to you that it is important to thoroughly assess all of the information that is available, but it is equally important—and perhaps more important—at this point in time to develop new and additional information, long-range, long-term information for most of the pollutants for which there is existing scientific information to assess. We have assessed that existing information year after year, and to continue to thrash the same wheat is not going to provide us any new grain.

As a final point, I would indicate to you that it is my view that the interdisciplinary research program identified by EPA is somewhat of a mystery program. If you recall EPA's budget presentation, you will remember that EPA has moved funds out of a number of areas into this interdisciplinary program.

It is not obvious to me what kind of activity is going to take place under that interdisciplinary research program, nor is it obvious that there is going to be a return of science back to those original programs from this interdisciplinary research program. In summary I am somewhat concerned that this money may simply get lost. As it is shuffled around, the original intent of the program from which that money was drained might suffer.

That is a summary of my statement. I would be happy to answer any questions that you might have.

[The prepared statement of Dr. Wood follows:]

Testimony of

Randolph Wood

on behalf of
The State and Territorial Air Pollution Program Administrators

before the

House Science and Technology Subcommittee
on Natural Resources, Agriculture Research and Environment

Good morning. I am Randolph Wood, Administrator of the Air Quality Division of the Wyoming Department of Environmental Quality. As President of, and on behalf of STAPPA, the State and Territorial Air Pollution Program Administrators, I wish to thank the Subcommittee for this opportunity to present the thoughts of the professionals throughout the country that have primary responsibility for managing state air pollution control programs on a day-to-day basis. My remarks today are directed to the EPA FY-1984 budget request for research and development programs.

Basic research and technology development, supported by the EPA, has been extremely important to the states, industry, and the public in the past. Failure to properly fund this essential activity in FY-84 and future years will deprive all of us of the knowledge, tools, and ability necessary to address and solve many of the problems with today's tools. It is imperative that the role of EPA research be put into perspective before its importance can be fully understood. Research in other technological fields such as the aerospace, computer, energy, and chemical industries, to name a few, will proceed at a rapid and well-funded pace because new information and breakthroughs gained through such research provide a marked advantage for the parent organization. In these and other facets of a capitalistic society, management recognizes that the fruits of basic research are increased profits, new product lines, and dividends from the stockholders. It is impossible to find this same forcing function when it comes to research which will provide the public with increased health protection. It is clear to me that without an effective EPA research program dedicated to providing all of us with "increased profits, new product lines, and dividends" in the area of air pollution and air pollution control, we will remain on horseback when a fast sports car is necessary to stay in the race.

In summary, it must be recognized that with very few exceptions, the private sector is simply not interested in, and will not provide, the research which EPA cannot conduct with a reduced budget. It is also erroneous to assume that we now have all of the answers and therefore may conclude that research activities can be curtailed.

I shall now identify a number of areas where additional research is necesssary, and comment on some of the specifics of EPA's budget proposal. In making these specific comments, I would note that the Office of Research and Development has identified as its clients the various other EPA program offices. No mention is made of the states as needy clients. Since the states represent the first line of defense and offense in the air pollution control effort, it is appropriate that some thought be given to their perceived needs.

Hazardous air pollutants represent an area of major concern for the states. As you are well aware, EPA has promulgated very few standards under Section 112 of the Clean Air Act, and the schedule presented in EPA's budget request for dealing with the 37 most discussed pollutants now extends into FY-85. There has been virtually no visible progress in addressing these 37 pollutants over the past years. It is important to note that the proposed FY-84 hazardous air pollutant budget of $9.88 million represents a major increase over the FY-83 budget, but is still below the FY-82 actual of $9.96 million. This comparison obviously does not take inflation into account. Given the slow pace of development of standards under Section 112 of the Clean Air Act and the fact that states are faced each day with situations in which hazardous or potentially hazardous pollutants are being emitted from an existing facility (or planned to be emitted from a new or modified facility), it is extremely important that EPA provide assistance to the states in evaluation of such situations. Ideally, this assistance would be in the form of guidelines on a generic program process which the state could use on a day-to-day basis to form an opinion as to potential risk, acceptable levels, etc. Some states have developed their own programs along this line but few have the technical expertise to develop and implement such a program. It is imperative that EPA recognize this problem and dedicate research and development resources to derivation of a solution. Our efforts in the past to obtain technical advice from EPA in specific instances have convinced us that the above outlined approach is necessary. We simply cannot afford to wait on EPA to respond to our individual inquiries.

In addition, increased emphasis must be placed on setting guidelines for acceptable levels of suspected hazardous pollutants. We would all like to be assured that we know all there is to know about a specific pollutant when a limit is established. However, we cannot wait for that assurance. The states need EPA, presumably through the office of Research and Development, to provide us with their best "guess" — properly footnoted — as a guideline for interim use. Without such guidelines, each state would conceivably develop its own opinion, resulting in total inconsistency across the nation.

Health effects and acceptable levels are important and necessary components of the question, but the picture is not complete without information on control techniques, monitoring methods, transport, and fate of hazardous air pollutants. Obviously, these are areas in which the states should and must rely upon the EPA research and development programs.

It is our fear, based upon a lack of visible progress in this area and considering the proposed reduction in this very important part of EPA's budget, that we cannot see the light at the end of the tunnel.

As a final note on hazardous pollutants, I can only conclude from EPA's documentation that emphasis and resources are placed upon short-term answers to questions which are politically important. If EPA is to properly implement its responsibilities in the future, it must also have a well-funded, long-term research program to evaluate potentially hazardous pollutants.

Virtually each permit issued by the states (and EPA) relies upon modeling to provide assurances that no violation of standards will occur as a result of the new facility. Each of us recognizes the shortcomings of existing models and continuously urges EPA to undertake the research and development necessary to improve and validate these models. Specific areas of needed research include complex terrain, long-range transport, visibility, and pollutant transformation. It is not apparent that EPA intends to address these issues at all with a reduced budget.

The states would disagree with EPA in its assessment that the development of control technology is solely the responsibility of the regulated community. We recognize the arguments in this assessment, but we are satisfied that such an approach is akin to having the fox develop a security system for the hen house. The benefits to industry due to EPA's past control technology development certainly far outweigh the costs of these programs. The states conclude that this is a program which has produced significant environmental benefits and one which should be continued.

EPA has responded to congressional concern over acid rain with an increase in funding for research of the problem. The states endorse this as an important and necessary increase in such research. However, we are concerned that this increase not be used as an excuse to curtail or terminate other necessary and important research and development activities.

I note in EPA's justification for its research and development budget relating to energy that it intends to devote significant resources to "the development and evaluation of health effects and engineering data which support the EPA Regional permitting and enforcement activities for synthetic fuel plants." This is certainly an important and necessary activity, but it should be expanded to include support for state activities in the field since, in many instances, the states are the responsible parties in permitting and enforcement activities. In fact, the State of Wyoming is evaluating a permit application for a coal-to-gasoline facility. In reviewing this permit application, we have been forced to develop hazardous pollutant evaluation techniques, control technology comparisons, etc., relying primarily upon information and experiences of other states. This is obviously a situation where EPA R & D assistance is appropriate.

In reviewing the proposed EPA research and development budget, I am attracted to EPA's highlighting of the increased resources to be devoted to scientific assessment as a means of strengthening the scientific basis of the standards and regulations. It is surely appropriate to scientifically assess all of the data available, but in the case of many pollutants — including a particle size standard, sulfur dioxide, ozone, sulfates, etc. — new data is needed. Therefore, an adequate research and development budget must include resources to provide this new data.

As a final point, I would identify the interdisciplinary research program as a mystery program. It is the recipient of an increase of $11 million, most of which is identified as a transfer from other R & D programs. There is much emphasis placed upon this transfer during the discussion of the other programs. However, I am unable to find any discussions of firm R & D commitments to indicate that this transfer of funds will result in a return of results to the original program.

Once again, I appreciate the opportunity to present these comments on behalf of STAPPA and I remain available to answer any questions you might have.

Mr. **Scheuer**. Well, we appreciate your very thoughtful statement, and I am sure we will have questions for you when the four of you are finished.

We have been joined by Mr. Norman Nosenchuck, and we are delighted to have you here.

We will now proceed to Mr. Leo Weaver of the Association of State and Interstate Water Pollution Control Administrators.

STATEMENT OF LEO WEAVER, ASSOCIATION OF STATE AND INTERSTATE WATER POLLUTION CONTROL ADMINISTRATORS, WASHINGTON, D.C., ACCOMPANIED BY ROBIN SAVAGE, ASSOCIATION OF STATE AND INTERSTATE WATER POLLUTION CONTROL ADMINISTRATORS, WASHINGTON, D.C.

Mr. **Weaver**. Thank you, Mr. Chairman. I appreciate very much the opportunity to be here. The original invitation was sent to our president, Jim Braugh. He is over testifying in an appropriations hearing at this time, and I was glad to have the opportunity to come in his place.

My present assignment is the executive director and chief engineer of the Ohio River Valley Water Sanitation Commission. I have with me Robin Savage who is the executive director of our association.

She tells me, and I want to pass this on to you, Mr. Chairman, she tells me that your staff has been particularly cooperative and has done an excellent job in working arrangements. We want to pass that on to you, because we appreciate that very much.

Mr. **Scheuer**. Let me say, I appreciate your comment. We think we have an outstandingly fine professional staff. They have made possible whatever we have been able to accomplish. Congressman McGrath and I, standing on our own, with our painfully thin knowledge base of these scientific matters, couldn't have accomplished what we have accomplished without them, and it is nice to hear you pay a very deserving tribute to us, and we appreciate it.

Mr. **Weaver**. It is a very important factor.

Mr. **Scheuer**. We feel very strongly that you hit it right on the nose. They are really exceptionally hard-working.

Mr. **Weaver**. ASIWPCA is a national, independent, and it is a nonpartisan organization, and it has been in existence about 20 years. It represents the 60 State, territorial, and interstate officials who implement their own responsibility areas in that respective jurisdiction legislative that the water programs of the various States, as well as the delegated and assigned responsibilities of the Federal act.

In summarizing, and I won't read the formal statement that has been prepared, Mr. Chairman. There are certain aspects of this that I think I want to hit and hit hard. One of them leading in is the result of a recent, white paper which was prepared by our R&D task force, and that is to hit again the fact just plain and simply that the complexity of the current water quality problems and the potential consequences of not addressing them absolutely dictate that the Federal Government remain the prime source of R&D funding and effort.

We want to emphasize that any other idea of application is really just ringing a hollow gob. At the risk of oversimplification, I wanted to make that clear going in.

What we see, however, is a decreasing funding position which gives us a great deal of concern, particularly when you apply that water quality we know has been applied across the board, but when you look and you see after a 15-percent decrease in 1981 and 1982, you see that the water quality research budget has been cut 43 percent between 1982 and 1983, and for 1984 there is a 38-percent cut earmarked. You have to almost say we have to change the spelling of the word from cut to gut, if you would.

You just have to reach that conclusion, and we are darn concerned about it.

In February 1983, the association completed a survey of its members about water quality research. We are application technicians, Mr. Chairman. We are not primarily associated with R&D as you well know. This work was conducted by Elmo Lund of the Tennessee Water Pollution Control Division, and I wanted to mention that particularly, because they did a very fine job of conducting this work.

There were some conclusions reached; 90 percent of the responses that were obtained in this survey indicated that R&D programs are necessary to support State water quality program effort. To some that may seem to be self-evident. It really isn't. It is a matter of people who are trying to do their best job in the field understand that they have got to have this kind of backup to help them.

They also reached the conclusion—three-quarters of them, in response—that the need for these programs will become even greater in the future than in the past, and that is a significant observation.

Mr. SCHEUER. Why is that?

Mr. WEAVER. That is because, Mr. Chairman, of what was brought out so vividly in the testimony of the Michigan group and the exchange here. You are talking about problems that, on the one hand, have been with us for some time in a latent sense, and yet here they are.

I can tell you, for example, in my own responsibility from the Ohio River Valley where we, if I do so, have probably some of the most sophisticated monitoring systems in existence, not only in this country but in the world.

I asked when I observed what was happening in Michigan—you know, we are concerned about another significant chemical which has extremely toxic considerations involved.

Is there some way that we can get a handle on what this is in the Ohio Valley per se, in the Ohio River particularly.

The response I got back was that the techniques are so complex that the problems and the technology of even measuring and doing a test of what the level might be was that I was completely discouraged from even trying to pursue this at the moment.

Mr. SCHEUER. The techniques?

Mr. WEAVER. The complexity of measuring the levels of dioxin in the water. We will pursue it, but this is a graphic example of where we need the Federal Agency.

Mr. **Scheuer**. I really do want to reserve the questions until later till all four of you have had a chance to testify, but our perception is that measuring techniques have increased enormously—the sophistication and the accuracy with which we can measure infinitessimal parts of let's say dioxin—have increased exponentially.

After all, they are measuring dioxin now, and the question is in the Tittabavassee River and Lake Huron is 50 parts per trillion acceptable or is the hundreds part per trillion that they found of dioxin in Lake Huron and elsewhere, is this acceptable? Or, does that threaten human health?

When you can measure 50 parts per trillion, and I have even heard a measure of parts per quadriollion, so our measuring—the new and enhanced technology for measuring— the merest trace of these chemicals has really radically improved.

Is it our ability to measure, or is it our ability to interpret the degree of hazard to human health that is caused by these infinitessimal traces that we now are able to measure that is the problem?

Which is the problem—our ability to measure it or our ability to interpret it and apply the knowledge that we can derive from these vastly enhanced measurement techniques that is the challenge for us—of you and we as legislators.

Mr. **Weaver**. Mr. Chairman, different perspectives. I questioned and raised the question of complexity of analysis. My responsibility on behalf of the Commission that I work for is in measurement. There is sometimes a very large difference between what might be measured with the most sophisticated research equipment and research laboratory and what can be applied on an ongoing basis reasonably for detecting that which is in the environment.

There is an application factor here. We do have—I mentioned that we have a very sophisticated system on line along the Ohio River. It has been on line now for almost 4 or 5 years. We call it the Organics Detection System.

We can measure in a parts per billion level of certain types of chemicals, and we are applying certain aspects of this, but the question is we have another and possibly another opening frontier, and that is why we got the response of from three-quarters of our membership saying that they saw that the future needs would even become greater.

So, we are talking about an application factor here in terms of the real what is happening. Then, beyond that of course, is what you are saying about the application of what is an acceptable risk—whether the no threshold approach should be applied, and that is a continuing concern on our part—what amount is acceptable.

Is any amount acceptable? And there you hit again with spades. You cannot accept an operating agency to come up with the basic research or the basic work that would allow that kind of decision to be made.

We need to have background information we can apply, and we don't want a father image necessarily telling us that this is what you shall do.

Certain circumstances are different in dealing with certain pollutants. It may not be the case with dioxin. You may say zero is where it needs to be nationally, and that is what we need to have, but we need to have that kind of information.

If we cannot get that from the Federal Agency, then I ask you, Sir, where will we get it? We are very proud of our working relationships with industry in the Ohio Valley. They have been very helpful, but if one thinks that they can depend totally on industry to do this work, to make the recommendatons, then, if I could submit, Sir, they have not paid too much attention to history. This is too much to ask. To depend on that approach would lead, I am afraid, to the results which we are not looking for.

I do not mean, in any case, a negative comment on industry. I just think they are a part of the team; they are a part of the problem; they are a part of the team; and they should have a part in it; but just a part.

I am taking more time than I should, Mr. Chairman, and I want to wind up.

In the areas of research requirements, Mr. Lund's group found that even though in recent years the conventional pollutants have been controlled, we have to spend increasing attention to the problem of toxic pollutants.

At the risk of redundancy, I would say that the toxic pollutant aspect is the No. 1 issue that was raised. This is in the more detailed comments that have been submitted as a part of this statement, I would just mention a few toxic pollutants leads the list, ground water standards and monitoring, the health effects of drinking water standards which the chairman mentioned, which is extremely important, effective sediment loadings on water column, land disposal systems, and improving water quality based criteria.

These are a few. I would end, Mr. Chairman, by saying that again I want to emphasize, and I will quote this— it is a statement. I think it bears saying again for the record.

> A strong, Federal presence is necessary to avoid duplication, to provide central direction, and make use of existing facilities and trained researchers.

We sincerely believe that, and we are committed to support it, and we are committed to support it as strongly as we are to commit to support and strong and effective water quality program in a clean water area.

The failure to continue to conduct sound thorough environmental research and development will greatly hamper effective management of the Nation's water in the years to come.

We certainly urge, Mr. Chairman, that the subcommittee do all it can to press for a maintenance of a strong Federal presence in this vital program. This completes my remarks.

[The prepared statement of Mr. Weaver follows:]

TESTIMONY OF LEO WEAVER

Mr. Chairman, Members of the Subcommittee:

My name is Leo Weaver. I am the Executive Director and Chief Engineer of the Ohio River Valley Water Sanitation Commission, and am here today to present the testimony of the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA).

ASIWPCA is a national, independent, non-partisan organization founded over 20 years ago. It represents the sixty State, Territorial and Interstate officials who implement the Clean Water Act on a daily basis.

ASIWPCA members have developed extensive experience in managing effective water clean-up programs, an increasingly challenging task in a period of state economic constraints and declining federal funding. Through this experience, we are well aware of the necessity for a strong, targeted research program if the Clean Water Program is to meet the quantitative and qualitative goals and objectives of the Act.

The Clean Water Act states that the Program is to be administered through a partnership of Federal and State governments. That partnership is equally essential in the research program as in permitting or construction grants management. Under this approach, EPA's research should be focused on national program concerns and should provide the foundation for establishment of criteria, standards and other mandated water quality program decisions. The applied research and development program can best be formulated by input from individual states.

A recent White Paper prepared by ASIWPCA's Research and Development Task Force addressed this point, when it noted that:

> "The complexity of current water quality problems and the potential consequences of not addressing them dictate that the federal government remain the prime source of R&D funding and effort. [In the past] state and federal roles were fairly clear. The federal government had established research facilities and provided states with the needed information to conform to both the local state law and the federal CWA...[State laws were] passed in a climate where it was assumed that EPA would continue to supply the necessary research information to meet the mandates of the law."

ASIWPCA members are increasingly concerned, however, that the continuing reductions in EPA's Research budget will preclude continuation of an adequate research effort.

As you know, Mr. Chairman, the Office of Research and Development's extramural R&D funding has declined nearly 50% between 1980 and 1983. And this trend is continued in the Administration's FY1984 budget proposal, where another 6% decline is requested.

The impact on water quality research has been especially severe. After a 15% decrease between 1981 and 1982, the water quality research budget was cut 43% between 1982 and 1983. For the 1984 Fiscal Year, EPA has proposed a further 38% cut -- a reduction of $11.3 million from the 1983 level.

In the view of ASIWPCA's members, such reductions are inappropriate when many major components of the Clean Water Program continue to require research attention.

In February 1983, the Association surveyed its members to determine their views about water quality research needs and EPA's R & D program. The results of that survey reflect our membership's views that:

- R & D programs are necessary to support state water quality program efforts;
- The need for these programs will become even greater in the future than it has been in the past;
- The centralized approach -- relying on EPA's Office of Research and Development -- is preferable to a decentralized approach in which individual states direct their own research programs; but
- States should have a greater voice in the Agency's establishment of its R & D priorities.

Last year, ASIWPCA adopted a position on Research and Development. The basis for that position rested on a recognized need for:

1) identification and demonstration of best management practices for nonpoint source pollution control;

2) selection of simplified and less expensive waste treatment alternatives for smaller communities;

3) continuation of new industrial processes development with resulting compounds having new treatment needs;

4) demonstration of improved processes for the removal of toxic pollutants by pretreatment or treatment processes;

5) quantification of cause and effect relationships between discharges and receiving (surface and ground) water quality involving improved monitoring techniques, analytical techniques, and modeling; and

6) clarification of the relationships between air and water pollution.

The survey I noted above -- taken just a month ago -- reiterated many of the same views. It revealed that the topics for which ASIWPCA members think federal water quality R & D would be most helpful are: Toxic Pollutants; Groundwater Standards and Monitoring; Effects of Sediment Loading in the Water Column; and Land Disposal Systems for Wastewater.

A complete copy of the survey results can be found at Attachment I.

In ASIWPCA's view, Research and Development programs in the past have dealt with real world technology needs, often identified in the regulatory effort, and this emphasis should be continued in the future. One example of these research needs is in the Operation and Maintenance of Municipal Wastewater Treatment Facilities.

In recent years as conventional water pollutants have been controlled, ASIWPCA members have devoted increasing attention to the problems of toxic pollutants. During its March 1983 meeting, the Association adopted a position calling for a Toxicity Elimination and Management Strategy. (A copy of this position statement is Attachment 2.)

To help ensure that this strategy is effective as a supplement to current BAT requirements, the Association stressed the importance of enhancing the research and development and technical assistance aspects of the national program. In particular, ASIWPCA recognizes the need for expanded research in protocols for bio-monitoring, environmental toxicology, complex organics analysis and specialized technology relating to control of toxicants from industrial facilities.

In toxicity control, as in the other subjects cited above, ASIWPCA sees the need for a sustained EPA commitment to Research and Development. As expressed in the White Paper on R&D:

> "the States do not have the resources to assume the R&D dropped by EPA. The current water quality problems of groundwater contamination, water quality standards, human health effects of toxic chemicals, and new treatment technologies are not, for the most part, unique to one state or the other. These are shared problems and by closing existing research facilities and decentralizing the research focus, the solutions will probably not be found. A strong federal presence is necessary to avoid duplication, provide central direction and make use of existing facilities and trained researchers. Many of our present water quality problems are pressing and demand immediate response. Changing the system of research and development in mid-stream may cause irrevocable damage to the environment and public health." [Emphasis added]

We recognize that EPA's past research efforts have suffered from frequent problems with improper collection and sampling techniques, inconsistent monitoring and poor quality assurance procedures. Nevertheless, the appropriate approach to these problems is to improve -- not to reduce -- the research effort. The States feel that it cannot be overemphasized that credible, defensible scientific data is needed for a sound and effective water quality program.

ASIWPCA members remain firmly committed to such programs in accordance with the Clean Water Act. We are well aware that in periods of economic constraint, research and development programs are often early targets for budget reductions. While in the short term this may appear to be a practical means to divert funds to other activities, we are certain that in the long run it will prove to be a false economy.

The failure to continue conducting sound, thorough environmental research and development will greatly hamper effective management of the nation's waters in years to come. ASIWPCA therefore urges the Subcommittee to do all it can to press for the maintenance of a strong federal presence in this vital program.

Mr. Chairman, Members of the Subcommittee, this concludes my formal statement on EPA's Research and Development Program. I would be pleased to answer any questions you may have.

Attachment 1

RESULTS OF A SURVEY OF ASIWPCA MEMBERS IN REGARD TO THEIR RESEARCH AND DEVELOPMENT NEEDS

March, 1983

The Office of Research and Development is the prinicipal scientific branch of the Environmental Protection Agency. The in-house research of this group is supplemented by the work of assisting agencies, the academic community, and private research projects that are funded totally or in part by the Environmental Protection Agency.

In recent years, however, the level of available funds for this work has declined, - a reflection of economic trends. The Association of State and Interstate Water Pollution Control Administrators (ASIWPCA), long concerned with the potential detrimental effects of these cuts, enlisted the aid of D. Elmo Lunn and his staff at the Tennessee Division of Water Management to develop and distribute a questionnaire to ASIWPCA members in order to gauge their research and development (R & D) needs. This questionnaire was developed in February of 1983 and distributed to the 56 ASIWPCA members. This document summarizes the information generated by the survey.

Twenty-six surveys were returned from the 56 that were distributed. Of the 26 surveys that were returned, twenty were from states, the remainder were from interstate agencies.

Three types of questions were utilized on the survey. The first type asked respondents to supply written information in regard to specific questions. This information has been ranked as to frequency of mention in the responses. In certain cases the respondent chose not to respond to a specific question. This has been noted in the results of that question.

The second type of question asked respondents to gauge their reaction to a statement on the following scale:

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

The information generated by this type of question has been presented as a (1) Mode, the most frequently given response as a precentage of the whole, (2) Mean, the average of all responses, and (3) Standard Deviation, a measure of the range of responses from the mean, which is an indication of the degree of concensus among the respondents.

This second type of question has also been grouped as a percentage of respondents who agreed, disagreed, or were undecided on specific questions.

The third type of question was multiple choice. This information has been presented as the precentage of respondents preferring each choice. Additional information has been given on the multiple choice questions that required a written response as one of the choices.

The Tennessee Division of Water Management is pleased to have assisted in the development and analysis of this survey and hopes that the information it provides will be of benefit to ASIWPCA. Any questions concerning the results of this survey should be directed to D. Elmo Lunn at (615) 741-2275.

State R & D Needs

In what areas can the Federal research and development program be most helpful to you in the administration of the national water program?

> 15% of the respondents chose not to reply to this question. Of the ones who did reply, the following areas were given as being R & D needs:
>
> (1) Toxic pollutants - 45%
> (2) Groundwater standards and monitoring - 36%
> (3) Health effects of drinking water standards - 23%
> (4) Effects of sediment loadings in the water column - 23%
> (5) Land disposal systems for wastewater - 18%
> (6) Improving water quality criteria data base - 14%
> (7) Analytical techniques for priority pollutants - 14%
> (8) Sludge disposal techniques - 14%
> (9) Control of nutrients from non-point sources - 14%
> (10) Control of nutrients from point sources - 9%
> (11) Affordable waste treatment systems - 9%
> (12) Asbestos contamination of aquatic systems - 5%
> (13) Lake restoration techniques - 5%

Attitudes about R & D

1. There is a strong need for R & D programs to support state efforts.
   Mode = 10, 38% Mean = 8.4 S.D. = 1.8

2. Not enough attention is given to R & D needs, at present.
   Mode = 7, 31% Mean = 7.3 S.D. = 1.9

3. The need for R & D programs is expected to become more important in addressing future issues than have been experienced in the past.
   Mode = 8, 19% Mean = 7.4 S.D. = 1.9

4. States are capable of providing their own R & D work.
   Mode = 3, 35% Mean = 2.9 S.D. = 1.5

5. At what level should R & D be conducted?
   a. Local - 0%
   b. State - 3.9 %
   c. Federal - 26.9%
   d. Combination - 69.2%

6. States are very dependent on EPA R & D programs, at present.
   Mode = 8, 27% Mean = 6.6 S.D. = 2.5

7. EPA currently has the expertise and facilities to address R & D needs in environmental programs.
   Mode = 4, 27% Mean = 5.4 S.D. = 2.0

8. The centralized (EPA-ORD) approach to R & D is preferable to a decentralized (individual states) approach.
   Mode = 8, 31% Mean - 7 S.D. = 1.8

Priority Needs

1. The current system of EPA R & D uses a combination of in-house research and extramural (contracted) research projects. This system should:

   a. Continue in its present form - 53.8%
   b. Be modified to allow for in-house research only - 3.9%
   c. Be modified to allow for extramural research only - 7.7%
   d. Other - 34.6%

   Of the respondents who chose d., the concensus was that the system should be modified to allow the individual states more flexability and input as to their R & D needs.

2. Assuming decreased funding levels for future R & D efforts, would you prefer:

   a. Increased funding for R & D at the expense of other EPA programs - 30.7%
   b. Maintain current funding levels and reprioritize R & D projects (eliminate low priority projects) - 65.4%
   c. Continue all current efforts at a minimal level of support - 3.9%

3. States should have a greater voice in the establishment of R & D priorities.
   Mode = 10, 50% Mean = 8.7 S.D. = 2.1

4. If additional reductions are made to EPA's R & D program, in what areas do you recommend?

   a. Reductions should be made by eliminating -
      46% of the respondents chose not to answer this question. Of the ones who did respond, the most popular areas were:
      (1) EPA overhead
      (2) Pure research of limited application
      (3) Duplication of programs
   b. Reductions should not be considered in the following R & D areas -
      35% of the respondents chose not to respond to this question. Of the ones who did respond, the following were popular suggestions:
      (1) toxic standards
      (2) health effects research
      (3) groundwater research
      (4) water and groundwater quality monitoring
      (5) sludge disposal alternatives
      (6) ongoing research
      (7) hazardous waste contamination

Since the use of a mode, mean, and standard deviation can be misleading and difficult to visualize when used to describe survey results, a different manner of presentation has been used below on certain questions. Responses falling into certain ranges have been classified in the following manner:

7-10 = AGREE
5-6 = UNDECIDED
1-4 = DISAGREE

This method does not distinguish degrees of agreement or disagreement, but should help describe the frequency of responses falling into those ranges. There were only 25 responses to Statement 6.

Attitudes about R & D

1. There is a strong need for R & D programs to support state efforts.

AGREE - 24 93.3%
UNDECIDED - 0 0%
DISAGREE - 2 7.7%

2. Not enough attention is given to R & D needs, at present.

AGREE - 20 76.9%
UNDECIDED - 4 15.4%
DISAGREE - 2 7.7%

3. The need for R & D programs is expected to become more important in addressing future issues than have been experienced in the past.

AGREE - 18 69.2%
UNDECIDED - 7 26.9%
DISAGREE - 1 3.9%

4. States are capable of providing their own R & D work.

AGREE - 1 3.9%
UNDECIDED - 3 11.5%
DISAGREE - 22 84.6%

6. States are very dependent on EPA R & D programs, at present.

AGREE - 16 64.0%
UNDECIDED - 2 8.0%
DISAGREE - 7 28.0%

7. EPA currently has the expertise and facilities to address R & D needs in environmental programs.

AGREE - 10 38.5%
UNDECIDED - 5 19.3%
DISAGREE - 11 42.3%

8. The centralized (EPA-ORD) approach to R & D is preferable to a decentralized (individual states) approach.

AGREE	- 19	73.0%
UNDECIDED	- 2	7.7%
DISAGREE	- 5	19.3%

Priority Needs

3. States should have a greater voice in the establishment of R & D priorties.

AGREE	- 23	88.5%
UNDECIDED	- 2	7.7%
DISAGREE	- 1	3.8%

Summary

The degree of concensus among the respondents of this survey was dependent on the type questions asked. Generally, a majority of the respondents agreed on the basic issues.

On the first type of question, wherein the respondents were asked to supply information, the responses were fairly diverse, which reflected the general nature of environmental problems. A significant number of respondents left these questions blank.

On the second type of question, wherein the respondent was asked to gauge his reaction to a statement, a large degree of concensus was found on Questions 1, 2, 3, 4, 8, and 3 (of the Priority Needs section), which were questions designed to determine the need for Federal R & D projects. Questions 6 and 7, however, which asked the respondent to make a value judgement, showed a lesser degree of concensus among the respondents.

The third type of question, which was multiple choice, showed very little concensus, perhaps due to the wording of the questions, which some respondents felt were ambiguous.

In general, it would seem that the respondents to the survey would almost unanimously desire EPA's R & D program to continue, at least at its current level, in order to provide needed information to the states. The respondents felt almost unanimously that the states were very dependent on EPA to fulfill this function. However, almost all respondents felt that the states should have more input into this process, in order to better assist the states in their specific needs, which are expected to increase rather than decrease in the coming years.

GW/vsp/ASIWPCA/hold 9

Attachment II

REFERENCE

Toxicity Elimination and Management Strategy (TEAMS)

ASIWPCA RECOMMENDATION

COM-1 In addition to supporting utilization of BAT, ASIWPCA supports the incorporation of a "Toxicity Elimination and Management Strategy" (TEAMS) in the national clean water program which should include the following:

1) Establishment by U.S. EPA, by date certain, of standard procedures and methods for biological assessment of acute and chronic toxicity of effluents and receiving waters.

2) Establishment by U.S. EPA, by date certain, of national guidance regarding those categories or subcategories of industries and municipalities which are candidates for conducting biological toxicity assessments.

3) Requirement that appropriate NPDES permitees submit, by date certain, action plans for the following: a) adequate characterization of the chemical nature of effluent waters, and/or b) conduct of biological toxicity assessments.

4) Development, by date certain, of specific state strategies for the elimination of toxicity from significant industrial and municipal dischargers, including a process for prioritizing and phasing activities and modifying NPDES permits, as necessary, to implement new requirements.

5) Achievement of compliance, by date certain, with NPDES permit requirements for the elimination of toxicity which are developed from the permittee action plans and state strategies.

6) Requirement for U.S. EPA to place additional emphasis on providing special technical assistance to States and adequate research and development support relating to this strategy.

7) Establishment of mechanisms to enable states to directly participate in the development of procedures, methods and guidance necessary to implement the "Toxicity Elimination and Management Strategy."

ADOPTED: March, 1983

PRIORITY: High

RATIONALE

The combination of traditional State water quality standards, Federal BPT based controls, and NPDES permit requirements have generally proven adequate for addressing control of "conventional" pollutants. In addition, this baseline of technology-based protection appears to be providing some control over "toxic" pollutants as well. But has this control effort been sufficient; that is, are we eliminating toxicity? Under the June, 1982 revisions to the NRDC Consent Decree, U.S. EPA has finally started turning out significant numbers of BAT guidelines; however, many questions are being raised about the long-term adequacy of these requirements with respect to meaningful control of toxicity. ASIWPCA has also long maintained that compliance with technology-based guidelines, while certainly a necessary part of the national program, still may not result in the actual elimination of adverse impacts from toxicity.

Thus, ASIWPCA believes the national clean water program has progressed to the point such that the elimination of "toxicity" (not pollutants, per se), pursuant to Section 101(a)(3) of the Act, is the next logical concern. The real program emphasis should be focused on providing a technically sound process for assessing and controlling toxicity on a facility-specific basis. In this regard, such initiative needs the backing of a national mandate for maximum effectiveness. This mandate should provide positive direction for U.S. EPA, the States, and NPDES permitees with respect to activities necessary to achieve the elimination of toxicity.

In order to help ensure that this toxicity elimination strategy is effective, research and development and technical assistance aspects of the national program need to be enhanced. This enhancement needs to begin with providing mechanisms for U.S. EPA and the States to work closely together on developing the front-end methods and guidance for toxicity control. Such coordination should continue via jointly developed, as appropriate, agendas for research and development. Finally, enhanced technical assistance in the fields of environmental toxicology, complex organics analysis, and specialized knowledge of technology relating to control of toxicants from industrial facilities would serve to reinforce the working partnership between U.S. EPA and the States.

The basic goals of the Act are properly aimed at protecting the "biological integrity of the nation's waters." ASIWPCA believes that prudent judgement calls for a biologically-based protocol for ensuring that adequate protection is provided by the national program. TEAMS is aimed at providing such an enhancement for the national clean water program.

Mr. **Scheuer.** Thank you very much, Mr. Weaver. Congresswoman Schneider had to leave for a markup session of another committee, but she asked me to express her great concern with this problem, her agreement with most of what you have said, and that as far as she is concerned you are preaching to the choir.

Dr. Edward Ferrand has arrived. Dr. Ferrand we would be very happy to have you join us here in this panel if you would come down to this end of the table and we will hear you when we finish with the other witnesses.

Miss Savage, do you wish to make a statement?

Miss **Savage.** No, thank you.

Mr. **Scheuer.** All right. Then we will hear from Mr. Nosenchuck representing the Association of State and Territorial Solid Waste Management Officials here in Washington.

Mr. Nosenchuck.

STATEMENT OF NORMAN NOSENCHUCK, ASSOCIATION OF STATE AND TERRITORIAL SOLID WASTE MANAGEMENT OFFICIALS

Mr. **Nosenchuck.** Thank you, Mr. Chairman, and members of the subcommittee. I appreciate this opportunity to testify on behalf of the New York State Department of Environmental Conservation and the Association of State and Territorial Solid Waste Management Officials.

I have some extended remarks and background that I would like to enter into the record. Incidentally, the reason that I am late is that it is snowing in Albany and we had to wait for deicing in Iceland.

Mr. **Scheuer.** Your statement will be printed in this form in the record as will all of the other statements.

Mr. **Nosenchuck.** Thank you, Mr. Chairman. I am pleased to be here to discuss my views on the types of research that the U.S. Environmental Protection Agency should conduct to help the States more effectively manage their solid and hazardous waste programs.

Clearly, if the states are to bear the greater responsibility for environmental management and protection, it would seem appropriate for EPA to conduct appropriate and continuing research that will allow this responsibility to be carried out.

What really concerns us is that EPA appears to be shrinking back by not providing the basic research needed by the States for effective municipal waste management and hazardous waste management.

I reviewed Dr. Courtney Reardon's March 10 statement before your committee. He stated on behalf of EPA research activities in this medium—and he was talking about hazardous wastes—will provide the scientific data needed to support the cost effective implementation of land disposal and incineration regulations.

I also note that EPA is asking for less money in fiscal year 1984 for solid waste management research than they had in 1983. Where does EPA stand include in their cost-effectiveness equation the necessary protection of the public health and the environment?

We really need to know what EPA means when they use the term cost effective implementation. One of the limitations that the States have in adequately managing their solid and hazardous waste programs—besides lack of adequate resources—is reliable scientific data.

Such data is needed for effective implementation and enforcement to the program. State, solid, and hazardous waste managers are confronted daily with environmental decisions which must be made inspite of the inadequacy of present decisionmaking tools and the unavailability of information to determine the minimum level of control at which given waste streams can be managed and still provide adequate protection to the environment and public health and integrated methodology based on scientific criteria will determine the most equitable and cost-effective alternatives.

However, the proper Federal role of developing standard sampling and analysis methods, standard toxicological characterization techniques, design and performance standards for management facilities, and research for and demonstration of innovative treatment and management technologies have been stymied by budget cuts to EPA's Office of Research and Development.

On November 19, 1981, EPA released an interim evaluation which found no dioxin hazard at municipal resource recovery facilities. This EPA interim evaluation of resource recovery facilities at five locations throughout the country indicated that tetrachlorinated dioxin emissions from the combustion of municipal wastes do not present a public health hazard for residents living in the immediate vicinity. This EPA interim evaluation stated, in part, "However, many unanswered questions relating to tetrachlorodibenzo-p-dioxin toxicity and exposure remain." Since there are insufficient data to answer these important questions and because this information is needed to assess the risk to people breathing emissions from the stack, the Agency has adopted a series of assumptions which are designed to represent the worst case possible. This is not good enough. Why hasn't EPA developed a national emissions standard for tetrachlorinated dioxins? They should do so. This is a Federal responsibility. It is not a State responsibility.

Some areas where additional federal research is needed follow:

There is a lack of criteria on risk assessment. The whole question of "How clean is clean?" under the Comprehensive Environmental Response Compensation Liability Act of 1980, or CERCLA, has to be answered. Who determines—and on what basis is it determined—when an inactive hazardous waste site has been adequately cleaned up?

We need guidelines. We need better guidelines for quality assurance [QA] and quality control [QC]. At this point, EPA tells the States generally what QA and QC are needed, but not the specific approaches. Laboratory accreditation standards are needed.

EPA should also conduct additional research in the following solid waste management areas: incineration technology; sampling techniques; sample analyses; influence of chemical compounds in mixtures; and mapping and interpretation of ground water resources.

Mr. McGRATH. Can I interject?

Mr. NOSENCHUCK. Sure.

Mr. McGRATH. I am going to have to go vote on something else, and I have a tremendous interest in this, as you may have gleaned, having the Hempstead resource recovery plant in my district and also having two landfills that are about to, and probably should be, closed, because of the proximity to the water that we drink and perhaps the contamination of our aquifers.

It is your responsibility for enforcement of certain environmental statutes, State environmental statutes, and I fully agree that it is the Federal role to establish—to do the basic R&D—and to establish some standards.

I heard Chairman Dingell say today that perhaps no standards would come out of any research and that was not our role perhaps to establish instatute research.

How is local government, the city of New York or the town of Hempstead, to determine which is the less environmental risk to the environment and to its constituents? Sanitary landfill for the disposal of garbage or incineration for the disposal of garbage—garbage is going to be with us. We are generating more garbage every day. What are we going to do? Who is going to make that judgment?

Should the town of Hempstead or should the city of New York have to make a judgment based on—they have the garbage, it is their problem. They have to pick it up, and they have to get rid of it.

But, the question is who is going to determine the quality assurance and quality control? In the absence of Federal criteria, the State has this responsibility clearly. Our State Department of Health—as a matter of fact, we have issued some guidelines which are about twice as restrictive on dioxin emissions.

However, I still believe that the Federal Government has a responsibility to, at least on the dioxin level and issues like that, to establish minimum national standards. Getting back to the issue of landfills. It depends upon sanitary landfills, and too many of them are open dumps—and resource recovery clearly, as land becomes more and more valuable and less and less of it, the city of New York, for instance, has no choice in my opinion but to go into a series of resource recovery facilities and upgrade and close out their other facilities.

Their fresh-kill facility on Staten Island, according to the city estimate, is only good for about 19 more years. On Long Island you have all those problems with aquifers. There is legislation that will probably be passed this session in the State legislature, closing out many landfills and going to some sort of solution down the road a piece.

Let me ask you this, and I agree with you that the problems and the only problems for landfills may be greater than the problems of the emission of some particulates into the air from a resource recovery.

How are we going to determine that at that stack level? Do we open it up and make our constituents guinea pigs for a period of time where those standards or where those tests can be conducted and then close it down? Particularly, in Hempstead, they make the horses cry at Roosevelt Raceway and things like that.

The question is what comes first—the horse or the cart? You know, our garbage is different than garbage in Europe where a lot of these EPA standards were gleaned. Our garbage is different than the garbage in the Midwest in some cases.

I had a town supervisor say at a public hearing to a group one day, "Look you complain about the landfill; the bottle of Perrier that you drink becomes a problem for me for 7 years when you throw it out."

What is being done at the State level? At the Federal level or any level in order to give the responsible government, the local government, the one who is responsible for picking up the garbage and disposing of the garbage—what is being done there?

Mr. Nosenchuck. All right, at the Federal level the Federal Government walked away from the municipal solid-waste problem and program in 1981. They walked away from resource recovery in 1980. The Federal Government, as far as they are concerned, says in effect there are no problems, and that, of course, we know is exactly the opposite. There are many problems.

Therefore, it is left to the individual States. We don't want anybody to be a guinea pig for anything. That is why I suggest that when we talked about the emissions—the necessity for national standards in dioxin. But, clearly, the bottom line responsibility for disposing of municipal solid waste rests with the local government.

The State has an obligation to propose and to put into place the proper laws, rules, and regulations, and to enforce them. In New York State, we have some excellent laws, and rules, and regulations. Our part 360.6 NYCR on solid-waste landfills is excellent—one of the best in the country.

The problems we are being told by local government is that they don't have the ability to come up with the money to put the facility to proper operation and maintenance or to close it up.

These are the problems. It is a problem really where society has ignored the issue until it becomes a crisis. Unfortunately, as a nation, we react to a crisis, and it is really starting to mount up, and it is going to blow.

You touched on some major areas of concern—the whole Long Island and New York City area is a major area of concern. Every landfill in New York City is an open dump. The Federal Government has totally walked away from that problem.

Mr. McGrath. All right. The question is always left to the local government to make a tough decision. Nobody from DEC, or EPA, or anybody gives enough information to them to make a reasonable decision.

The decision is made when we can't dump any more because we don't have any room to dump any more, and I would suggest to you that a lot of the laws that come out of New York State and a lot of the research that comes out of EPA is all for naught, because when it is tested in court, and it was tested in court with the ocean dumping, after Nassau County went and built a $36 million plant in order to take care of its garbage.

It was tested in court, and we are allowed to dump again in the ocean.

Mr. Nosenchuck. Let me just react to the ocean dumping. I was in that program, and there was no Federal research in ocean dumping, in dumping in the ocean. That was a Federal policy decision in 1972. A major mistake was made when they decided that, and many of us in New York State told the Feds that that is why there is no scientific research to this day that says you shouldn't dump in the ocean. Waste dump is a question that is still to be resolved.

There never has been research in that area. Getting back to the assistance that the State Department of Environment provides the community, it is limited. Why is it limited? In 1980, when the Feds walked away from Federal support and State's resource recovery, we had no choice in New York but to eliminate those positions.

In 1981, we eliminated the rest. We went from about 78 people to about 14, or 15, or 16 statewise—about an 80-percent reduction.

The State of New York also suffered through an economic crisis, and we couldn't pick up those resources. We are working toward that end. Right now in the hazardous waste area, we were fortunate just a couple weeks ago in having legislation passed and enacted that provides for a fee system for an environmental regulatory fund so we could enhance and increase our program.

We will be putting on about 55 more people in hazardous waste, most of which go into our regional offices. But they have to be educated and have to support these areas also.

Mr. McGRATH. Excuse me for having to leave. I have to go vote. Say hello to Maurice Henche for me.

Mr. NOSENCHUCK. I certainly will. Thank you, Mr. Congressman.

Mr. SCHEUER. We are going to suspend for about 10 minutes. Both of us have to go vote in the other room. We will be back in about 10 minutes, and we will be happy to hear you then.

[Recess taken.]

Mr. SCHEUER. The committee will resume. Mr. Nosenchuck.

Mr. NOSENCHUCK. Yes, thank you, Mr. Chairman. This past January, EPA's interim final regulations for land disposal of hazardous waste became effective. In my opinion, these regulations provide disincentives for the development of alternative treatment technologies. The EPA regulations should contain requirements that by an established date, specific wastes or classes of wastes not be landfilled; that they be incinerated, neutralized, fixed, chemically destroyed, or handled by other means of treatment.

It is patently obvious that secure land burial is an inappropriate technology for many hazardous wastes and is not the optimum technology for the disposal of many others. Secure land burials should be used only for those hazardous wastes for which secure land burial has been shown to be environmentally sound, and for which no other means of treatment or disposal is feasible.

Incineration, neutralization, fixation, chemical destruction, and other means of treatment are preferable to land burial, because they afford better long-term protection of human health and the environment.

Of greatest concern are wastes that contain chemicals which are environmentally persistent; have high environmental mobility, particularly in a soil environment; are human carcinogens; are very highly toxic to humans, plants, and animals; or possess highly hazardous physical properties, such as explosiveness or low flash points. Additional EPA research is needed in this area.

EPA's continuing failure to formulate a national policy to prohibit landfilling of wastes that I just described, and to force a transition to more appropriate technologies, is a disservice to the American public. It is very difficult for States to independently require the development of innovative treatment technologies for destruction or detoxification of hazardous wastes.

Without Federal action for appropriate national standards, stringent requirements on industry by an individual State could easily result in the loss of existing industries to other States that allow land burial, despite its limitations.

The Congressional Office of Technology Assessment [OTA] recently published a report, "Technlogies and Management Strategies for Hazardous Waste Control," which contains the following statement on page 9:

> There is a need for a long-term, systematic EPA plan—for which a congressional mandate does not yet exist— for obtaining more complete and reliable data on hazardous wastes, facilities, sites, and exposures to and effect from releases.

This is where EPA should be concentrating its research effort and increasing its activities.

EPA should also promote the transfer of recycling and detoxification technology. More research is needed in connection with providing additional emphasis on resource recovery, recycling, and detoxification of hazardous waste materials.

Without an effective EPA research program, needed national research and development for nonhazardous waste and hazardous waste management will not occur. The States cannot coordinate activities required for national standards.

Such a State-by-State approach to research would prove costly, duplicative, and ineffective. Research is a proper Federal function. The States do not have either sufficient staff nor sufficient resources to support this type of research. The States have the responsibility to utilize national standards, and to monitor compliance with and enforce related regulations.

If cuts in the Federal hazardous-waste-management program continue to occur, the States will have no choice but to reprioritize their hazardous-waste-management activities to maintain protection of the public health and and environment. However, this would be only a stopgap remedy. Juggling limited funds, rearranging money into different slots, as Federal matching funds appear or disappear, is not the solution.

What is needed is an adequately funded, long-range Federal research program that will provide a sound basis for cost-effective, positive control of hazardous wastes generated now and in the future.

I would be happy to answer any questions.

[The prepared statement of Mr. Nosenchuck follows:]

STATEMENT OF

NORMAN H. NOSENCHUCK
DIRECTOR, DIVISION OF SOLID WASTE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK

BEFORE THE

SUBCOMMITTEE ON NATURAL RESOURCES,
AGRICULTURE RESEARCH AND ENVIRONMENT

COMMITTEE ON SCIENCE AND TECHNOLOGY
UNITED STATES HOUSE OF REPRESENTATIVES

April 19, 1983

Thank you Mr. Chairman and members of the Subcommittee.

I appreciate this opportunity to testify on behalf of the New York State Department of Environmental Conservation.

I am pleased to be here to discuss my views on the types of research that the United States Environmental Protection Agency (EPA) should conduct to help the states more effectively manage their solid and hazardous waste programs. Clearly, if the states are to bear a greater responsibility for environmental management and protection, it would seem appropriate for EPA to conduct appropriate and continuing research that will allow this responsibility to be carried out.

What really concerns us is that EPA appears to be shrinking back by not providing the basic research needed by the states for effective municipal waste management and hazardous waste management. I reviewed Dr. Courtney Riordan's March 10 statement before your Committee. He stated on behalf of EPA: "Research activities in this medium (hazardous waste) will provide the scientific data needed to support the cost-effective implementation of land disposal and incineration regulations." I also note that EPA is asking for less money in Fiscal Year 1984 for solid waste management research than they had in 1983. Where does EPA include in their cost-effectiveness equation the necessary protection of the public health and the environment? We really need to know what EPA means when they use the term "cost-effective implementation."

One of the limitations that the states have in adequately managing their solid and hazardous waste programs--besides lack of adequate resources--is reliable scientific data. Such data is needed for effective implementation and enforcement of the program.

State solid and hazardous waste managers are confronted daily with environmental decisions which must be made in spite of the inadequacy of present decision-making tools and the unavailability of information. To determine the minimum level of control at which given waste streams can be managed and still provide adequate protection to the environment and public health, an integrated methodology based on scientific criteria, will determine the most equitable and cost-effective alternatives. However, the proper federal role of developing standard sampling and analysis methods, standard toxicological characterization techniques, design and performance standards for management facilities, and research for and demonstration of innovative treatment and management technologies have been stymied by budget cuts to EPA's Office of Research and Development.

On November 19, 1981, EPA released an interim evaluation which found no dioxin hazard at municipal resource recovery facilities. This EPA interim evaluation of resource recovery facilities at five locations throughout the country indicated that tetrachlorinated dioxin emissions from the combustion of municipal wastes do not present a public health hazard for residents living in the immediate vicinity. This EPA interim evaluation stated, in part, "However, many unanswered questions relating to TCDD's (tetrachlorodibenzo-p-dioxin) toxicity and exposure remain. Since there are insufficient data to answer these important questions and because this information is needed to assess the risk to people breathing emissions from the stack, the agency has adopted a series of assumptions which are designed to represent the "worst case" possible." This is not good enough. Why hasn't EPA developed a national emissions standard for tetrachlorinated dioxins? They should do so. This is a federal
JT's
responsibility--not a state responsibility.

Some areas where additional federal research is needed follow:

- There is a lack of criteria on risk assessment. The whole question of "How clean is clean?" under CERCLA (PL 96-5103), has to be answered. Who determines--and on what basis is it determined--when an inactive hazardous waste site has been adequately cleared up?
- We need guidelines for quality assurance (QA) and quality control (QC). At this point, EPA tells the states generally what QA and QC are needed, but not the specific approaches. Laboratory accreditation standards are needed.

EPA should also conduct additional research in the following solid waste management areas: a) incineration technology; b) sampling techniques; c) sample analyses; d) influence of chemical compounds in mixtures; and e) mapping and interpretation of groundwater resources.

This past January, EPA's interim final regulations for land disposal of hazardous waste became effective. In my opinion, these regulations provide disincentives for the development of alternative treatment technologies. The EPA regulations should contain requirements that by an established date, specific wastes or classes of wastes not be landfilled; that they be incinerated, neutralized, fixed, chemically destroyed or handled by other means of treatment. It is patently obvious that secure landburial is an inappropriate technology for many hazardous wastes and is not the optimum technology for the disposal of many others. Secure landburials should be used only for those hazardous wastes for which secure landburial has been shown to be environmentally sound, and for which no other means of treatment or disposal is feasible. Incineration, neutralization, fixation, chemical destruction and other means of treatment are preferable to landburial because they afford better long-term protection of human health and the environment.

Of greatest concern are wastes that contain chemicals which (1) are environmentally persistent; (2) have high environmental mobility, particularly in a soil environment; (3) are human carcinogens; (4) are very highly toxic to humans, plants and animals; or (5) possess highly hazardous physical properties, such as explosiveness or low flash points. Additional EPA research is needed in this area.

EPA's continuing failure to formulate a national policy to prohibit landfilling of wastes that I just described, and to force a transition to more appropriate technologies, is a disservice to the American public. It is very difficult for states to independently require the development of innovative treatment technologies for destruction or detoxification of hazardous wastes. Without federal action for appropriate national standards, stringent requirements on industry by an individual state could easily result in the loss of existing industries to other states that allow landburial, despite its limitations.

The Congressional Office of Technology Assessment (OTA) recently published a report, Technologies and Management Strategies for Hazardous Waste Control, which contains the following statement (on Page 9): "There is a need for a long-term, systematic EPA plan--for which a congressional mandate does not yet exist--for obtaining more complete and reliable data on hazardous wastes, facilities, sites, and exposures to and effect from releases." This is where EPA should be concentrating its research effort and increasing its activities.

EPA should also promote the transfer of recycling and detoxification technology. More research is needed in connection with providing additional emphasis on resource recovery, recycling and detoxification of hazardous waste materials.

Without an effective EPA research program, needed national research and development for non-hazardous waste and hazardous waste management will not occur. The states cannot coordinate activities required for national standards. Such a state-by-state approach to research would prove costly, duplicative and ineffective. Research is a proper federal function. The states do not have either sufficient staff nor sufficient resources to support this type of research. The states have the responsibility to utilize national standards, and to monitor compliance with and enforce related regulations.

If cuts in the federal hazardous waste management program continue to occur, the states will have no choice but to reprioritize their hazardous waste management activities to maintain protection of the public health and environment. However, this would be only a stopgap remedy. Juggling limited funds, rearranging money into different slots as federal matching funds appear or disappear, is not the solution. What is needed is an adequately funded, long-range federal research program that will provide a sound basis for cost-effective positive control of hazardous wastes generated now and in the future.

EXPANDED COMMENTS AND BACKGROUND MATERIAL

SUBMITTED FOR THE RECORD BY

NORMAN H. NOSENCHUCK
DIRECTOR, DIVISION OF SOLID WASTE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK

BEFORE THE

SUBCOMMITTEE ON NATURAL RESOURCES,
AGRICULTURE RESEARCH AND ENVIRONMENT

COMMITTEE ON SCIENCE AND TECHNOLOGY
UNITED STATES HOUSE OF REPRESENTATIVES

April 19, 1983

1. New York State is specifically concerned with two major areas of land disposal regulations (40 CFR Part 264). These two major areas are with regard to (A) The translation of performance standards into specific design, construction and operating requirements by EPA; (B) The provision for exemptions from groundwater monitoring and response requirements and liner and leachate collection and removal requirements as presently proposed in the land disposal regulations. Additional EPA research is needed in these areas.

    (A) *The performance standard concept*. The land disposal regulations principally consist of "performance standards" which are defined in the preamble (FR, Page 32284) as engineering objectives which allow the permit applicant to develop a design or set of practices to achieve the objective. The regulation also speaks of the performance standards as "general common sense engineering goals leaving the details to be specified on a case-by-case basis in permits." There are a few "design and operating standards" (i.e., specific engineering practices or material specifications such as minimum thickness of final cover) contained in the regulation. Although this is understandable due to the fact that the regulations must service the entire nation, it raises concern that there must be careful surveillance of the application of these regulations to assure that the EPA regions apply them consistently and equitably. These regulations must be tested before we will be able to judge their effectiveness in protecting the environment since the "performance standards" must be translated into specific "design and operating standards" for each permit application.

(B) Exemptions

(1) New York State believes that EPA should reconsider the provision in Subpart F which provides for an exemption from the groundwater monitoring and response requirements. It seems to us that providing an exemption for land disposal facilities is not consistent with the fundamental goal and strategies stated at the outset in the preamble (FR, Page 32284). Whereas the regulation seems to consider groundwater monitoring and response programs an essential backup to a liquids management strategy, an exemption from this backup system could be approved by the Regional Administrator if he found no "potential" for hazardous constituents to migrate from a regulated unit to an upper most aquifer. Since prevention of migration of waste constituents is the stated goal of the regulation, no exemption from groundwater monitoring and response should be allowed for an existing or new land disposal facility since monitoring is the only positive means, except for a double lined unit with a leak detection system, to verify that the design and operating standards contained in a permit for the waste management unit are effectively controlling the leachate that is generated during the active and post-closure period of the regulated unit.

(2) The EPA regulations should not provide for an exemption from the liner and leachate collection and removal requirements for surface impoundments, waste piles and landfills contained in Subparts K, L and N respectively. The liner and leachate collection and removal system is the keystone of a liquids management strategy; it can prevent contamination of soil and groundwater. New York State believes that the liner and leachate collection and removal system is the first and foremost line of defense against groundwater contamination. Although favorable hydrogeological conditions (e.g., thick impermeable clay soils) may be present, such conditions should be regarded only as factors which favor the location of a land disposal facility at a particular site. The

natural favorable hydrogeological conditions should not be utilized as, nor should they substitute for the positive leachate control provided by an engineered land disposal design.

2. RCRA Exemptions for Characteristic Hazardous Wastes Destined for Beneficial Use, Resue, Recycling or Reclamation.

Additional EPA research is needed in this area.

A. Manifest Exemption

Current Federal regulations exempt characteristic hazardous waste destined for beneficial reuse or recovery, other than sludges, from manifest requirements (40 CFR 261.6). In the case of waste destined for energy recovery, New York State believes that such an exemption provides an opportunity for unscrupulous generators and transporters to misrepresent the nature and actual intended fate of wastes in order to avoid regulatory requirements for environmentally safe treatment or disposal. Manifesting characteristic waste destined for energy recovery provides assurance to the regulatory agency that the proper facility has received the waste. It also assists in identifying enforcement actions where wastes have been tampered with before or during transit.

B. Permit and Facility Standard Exemption

Facilities which utilize characteristic wastes other than sludges, for energy recovery purposes are totally exempt from RCRA regulation. Also, such facilities that utilize listed wastes and sludges must meet certain storage requirements, but the combustion unit is not required to comply with RCRA standards, other than the incinerator standards. These exemptions are unwise since it ignores potential air pollution impacts of burning waste fuels. Although New York provides an exemption from hazardous waste regulations for the management (i.e., treatment and storage) of characteristic waste which are beneficially used or reused, it requires that energy recovery facilities obtain a Permit to Construct and a Certificate to Operate an air contaminant source. At the present time, New York is also preparing regulations which make a distinction between virgin and waste fuels with the intention of specifying the allowable composition of waste constituents in fuel, combustion unit efficiency and air quality impacts.

3. Identification and Listing of Hazardous Wastes

Additional EPA research is needed in this area.

The present EPA approach of listing substances as hazardous waste should be modified since it results in a substance being a regulated hazardous waste in one situation and a non-regulated waste in another, although physically and chemically identical substances; in other words, the source of the waste (i.e., how it is generated) is the primary mechanism used to list a waste rather that its toxic or hazardous properties.

The present listing of hazardous waste in 40 CFR Part 261, Subpart D should be expanded. Of special significance is the fact that wastes which may be hazardous to the environment and/or public health are not considered RCRA regulated listed hazardous wastes because they were not generated as "discarded commercial chemical products, off-specifications species, container residues, and residues thereof" (40 CFR 261.33). Since these substances are hazardous as "discarded commercial chemical products, etc.," they should also be regulated as a hazardous waste whenever they are generated by other means, such as the result of a manufacturing process.

In addition, the list of hazardous waste from non-specific and specific sources (40 CFR 261.31) appears to represent the larger and the more common industrial processes. Additional evaluation should be performed for less common industrial processes which generated hazardous wastes or sludges.

4. Mixtures of Listed Hazardous Wastes (40 CFR 261 Subpart D)

Additional EPA research is needed in this area.

Mixtures that contain one or more of the substances listed in 40 CFR Part 261, Subpart D, should be defined as hazardous wastes. For example, New York State is concerned that mixtures of substances listed in Section 261.33(e) or (f) are not designated as a regulated hazardous waste due to the fact that the mixture is not considered a "commercial chemical product or manufacturing chemical intermediate" because the mixture no longer consists of pure or technical grade chemical formulation in which the chemical is the "sole active ingredient." Therefore, in this case, a mixture of substances listd in Section 261.33(e) or (f) could escape regulation as a hazardous waste, unless the waste mixture were generated from non-specific or specific sources (40 CFR 261.31 and 261.32) or failed a test for characteristic hazardous waste

(Subpart C of 40 CFR Part 261). In addition, mixtures of materials listed in Sections 261.31 and 261.32 should be listed hazardous wastes.

5. Waste Oil

Additional EPA research is needed in this area.

Under current Federal regulations, waste oil may or may not be a hazardous waste depending upon whether it passes or fails one of the characteristic tests, usually EP Toxicity for maximum lead concentration (40 CFR 261.24). However, if a particular waste oil is a characteristic hazardous waste, it still is not regulated under RCRA (no permit and no manifesting required) if it is beneficially used, reused or legitmately recycled or reclaimed per 40 CFR 261.6. In most cases, the concerns of New York State are with regard to the transportation and use of waste oil for purposes of energy recovery.

New York State did not follow the approach of EPA regarding the waste oil issue. When New York revised its solid waste management regulations in 1982 to incorporate interim status standards, it did provide permit-exempt status for facilities that burn waste oil for energy recovery. However, regulations do require such a facility to obtain air quality construction and operating permits. We also imposed controls over the transportation of waste oil by requiring registration of transporting vehicles and manifesting of hazardous waste oil generated in quantities greater than 1,000 kg per month. The State has found significant problems with waste oil shipping and handling, especially with foreign contaminating substances (e.g., listed hazardous wastes) being identified in the waste oil.

Since New York perceives that there is a high potential for abuse in the area of waste oil/waste fuel markets, it is recommended that the U.S. Environmental Protection Agency consider either (a) listing waste oil as a hazardous waste or (b) creating a separate category to control the distribution and disposal of waste oil because of its inherent hazardous characteristics. Waste oil is simply too difficult to control as a characteristic hazardous waste.

6. Underground Storage Tanks

Additional EPA research is needed in this area.

The New York State Department of Environmental Conservation considers the storage or treatment of hazardous waste in underground tanks to be environmentally imprudent. Underground tanks either cannot be or will not be properly inspected to guarantee that leakage is nor occurring. Also, the inspection or testing of underground tanks means that they must be taken out of service; possibly a costly inconvenience. Above ground tanks can be visually inspected externally and leaks timely discovered to prevent environmental or public health impacts.

The EPA should consider the following actions:

(a) An immediate prohibition of new underground tanks by rule promulgation;

(b) A gradual phase-out of all existing underground tanks should be required.

However, if EPA chooses to allow the permitting of underground tanks that can be entered for inspection, New York State recommends that such tanks be double-walled construction with an internal leak detection system.

7. Secondary Containment for Tank Facilities

Additional EPA research is needed in this area.

Under current Federal regulations in 40 CFR 264 Subpart J, new or existing storage or treatment tanks are not required to have secondary containment systems. Evaluation of the tank shell strength and inspection are relied upon for preventing tank leakage. However, this approach is not a guarantee that failure cannot occur.

A containment system such as that required for containers in Subpart I of Part 264 is needed to protect surface and groundwater resources; it has been utilized for hazardous material storage for several years. If a containment system were required, the dependence upon evaluation of tank shell strength (i.e., wall thickness) could be de-emphasized.

8. Definitions of Surface Impoundment and Tank

Additional EPA research is needed in this area.

The definitions for surface impoundment and tank, contained in 40 CFR Part 260 Subpart B, need clarification so that the appropriate facility standards can be determined. Considerable confusion has occurred where a storage or treatment facility for hazardous wastes apparently could satisfy portions of both definitions. One example of this type of situation is the case of an uncovered waste management unit constructed of concrete, possibly lined with a synthetic material and placed in a manmade excavation. There has been difficulty in determining whether tank or surface impoundment facility standards should govern; that is, either Subparts J or K of 40 CFR Part 264, respectively.

The principal concern is whether an inground or underground tank should be regulated like a surface impoundment. New York State believes that groundwater monitoring, as required for surface impoundments, should be required for all inground tanks and underground tanks, if they are permitted (see item no. 8 above) in order to provide for leak detection and groundwater protection. Since groundwater monitoring is not required under the EPA tank standards (40 CFR Part 264 Subpart J), inground tanks should be either regulated as surface impoundments as per Subpart K of 40 CFR Part 264 or the tank standards in Subpart J should be amended to require groundwater monitoring for inground or underground tanks.

9. Regulation of Wastewater Treatment Units

Additional EPA research is needed in this area.

Wastewater treatment units are exempt from facility standards as per 40 CFR Part 264 Subpart A. By virtue of the definition of wastewater treatment unit in 40 CFR Part 260 Subpart B, EPA has chosen not to regulate those facilities which discharge either directly to surface waters (i.e., permit sources) or discharge to publicly owned treatment works (POTW).

New York State modified the EPA definition of "wastewater treatment unit" in its solid waste regulations (6 NYCRR Part 360) such that facilities which discharge to publicly owned treatment works are regulated in New York State. New York State does provide an exemption for wastewater treatment units that have a point source discharge as in the EPA exemption.

It is New York State's opinion that EPA should control wastewater treatment units that discharge to POTW's because these facilites do not have the equivalent level of regulatory review and oversight that is presently provided by the State and Federal Government for point source discharges to surface waters. The storage, treatment and handling of hazardous waste prior to their discharge to a POTW should be regulated.

Mr. Scheuer. Thank you very much, Mr. Nosenchuck, for continuing the high standards which this panel has set.

We will now go on to our holdover witness. We are delighted you are here. We understand that you caught the last plane here. We are delighted to hear from you. Your testimony will be printed in full at this point in the record. So, if you could simply summarize and hit the high points, we would appreciate it, and please feel free to react to anything that you have heard either from the witnesses or from my colleagues up here on this side.

STATEMENT BY DR. EDWARD F. FERRAND, ASSISTANT COMMISSIONER FOR SCIENCE AND TECHNOLOGY, NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Dr. Ferrand. What I have heard since I got here, I think, fits in pretty well and duplicates quite a bit what I presented in my written statement.

I have a number of areas that I wrote about. I would like to emphasize the first one, because I think it is one that has been neglected. It is the area of research that facilitates how the public accepts the measures that are needed to protect their environment.

The most important phase of an environmental protection program is to get the job done, to get the controls in place. Very often we have great difficulty in doing that, and there has been never an organized effort to do the type of research that brings in expertise in areas other than science and technology, that is, the soft sciences. We need guidance and leadership from the Federal Government in applying these to environmental problems.

We need greater expertise in approaching our citizens and telling them, "Look, this is what is needed. This has to be done. Here is some credible information that we can use to get your support."

I won't repeat too much what I have written on hazardous wastes, because Mr. Nosenchuck has expounded that pretty well. Along this line, I can say that we continue to have difficulties in trying to get hazardous waste disposal facilities in place, regardless of their nature, whether it be incineration, landfill, or whatever, because of the public's present feelings, that is their raised sensitivity to hazardous wastes which causes them not to want to see any such facilities anywhere near them.

We have some special problems in New York City, and we still have alot of unanswered questions in terms of information that we need. The technological and economic feasibilities and the environmental acceptability of the various methods of disposal of sewage sludge on land, at sea, or by combustion are issues of national importance that need to be researched and demonstrated on a realistic scale by the Federal Government.

There do exist a variety of processes at different stages of development for the conversion of sludge and solid waste into solid gaseous or liquid fuels which must be investigated from an objective viewpoint and demonstrated on a full scale before they can be adopted by any prudent municipality as its long-term solution.

A serious complication of recent origin is the dioxin issue, and until the Federal Government produces credible research on how dioxins are produced during combustion, the effectiveness of control measures, the persistences of the substances in the environment, and most importantly the safe levels of exposure, even a technology as well established as incineration is going to become unavailable for solution of the urban waste disposal problem.

We are finding difficulties with areas where in the past people buried things. Now, because we need to put a sewer line through or because a strucure is going up, we are faced with great difficulties, because nobody wants us to disturb that ground.

We have no really good guidance or criteria to follow in saying, "Here is a situation we have investigated. According to these criteria, it is safe or unsafe, and we know how to proceed."

That is a problem that is with us at the present, and it is very real and very upfront.

One special area in cities such as New York is the problem that is created in the diffusion of pollutants because of the vertical structure of the city. Densely populated metropolitan areas, especially those with tall buildings and canyon streets and heavy traffic, in the past have not received the research attention they merit. Examples of the lack of emphasis are found in the driving cycles used to test emission rates from vehicles and the slowness of the development of computer models for simulating the diffusion of pollutants emitted by vehicles within the canyon streets, or of pollutants emitted from tall stacks in the vicinity of tall buildings.

We are right now going to get a State implementation plan together for carbon monoxide and photochemical oxidants. We have to take measures, some of them quite draconian, and yet the models that we need to calculate what is causing the oxidant levels and what benefits will be created by taking these measures are very inadequate. They should have been developed a long time ago, therefore, an accelerated program should be instituted to get us there before we spend too much time and resources doing things that are not particularly beneficial.

One of the critical areas in New York City is the problem of what is going to happen in the future with diesels. Experience in other cities where there is wholesale use of diesels indicates that we certainly are going to be faced with a major problem with visibility and a problem from high levels of particulate matter.

The most critical question is the effect that increasing percentages of diesels in the vehicle population of New York City will have on our health. Progress in this area of research is still, I feel, far behind the stage which should have been attained.

Another problem that we have is the problem of indoor air pollution. We get an increasing number of complaints from people about this type of air pollution. We have made big improvements in the outdoor air pollution, but indoor air pollution is becoming a much more sensitive area.

We feel that it is even possible that we have reached a point where the exposures from indoor air pollution are more serious than exposures from outdoor air pollution.

Mr. Scheuer. Are you speaking of indoor air pollution in the home or at the workplace?

Dr. Ferrand. Both. We get complaints from the work place, and we get complaints from the homes. It has become one of our biggest sources of calls from the public. Also, it includes areas where the public goes—malls, theaters, sports arenas, and so forth. This is one problem about which the Federal Government has done very little, if anything, and is not planning very much at all.

We think that this is an area that should be investigated.

I have some short material that I did not include in the printed statement I gave you. It will take me about 2 minutes to read it.

Our present level of uncertainty about the safety or harmfulness of exposures to many of the chemicals surrounding us can be attributed to insufficient resources for health effects research. There is inadequate coordination of the available resources and the absence of a unified purpose in a master plan coordinating the activities of the various agencies investigating the effects of environmental contaminants.

Research funds for determining the effects on health and welfare of exposures to environmental contaminants are scattered by a number of Government agencies among a supply of investigators that is inadequate.

Therefore, I recommend the establishment of a national body with real powers to develop within a reasonable timeframe a logical and efficient system for assessing the adverse health and welfare effects of actual and potential exposures.

The purpose of this central body would be to establish the level of research required and to determine the extent of the resources that should be made available, to design and recommend programs that provide the needed facilities and the number and quality of investigators, to oversee the granting of funds to insure that program objectives are pursued, and to monitor the results of funded research for quality and appropriateness and report periodically on progress from the perspective of national goals.

[The prepared statement of Dr. Ferrand follows:]

TESTIMONY OF DR. EDWARD F. FERRAND

In 1967 I left the faculty of the Cooper Union School of Engineering to organize and direct what is now the Bureau of Science and Technology in the Department of Environmental Protection of the City of New York. The Bureau is responsible for monitoring drinking water, investigating drinking water and air quality problems, computer simulation modeling and review of environmental impact analyses, testing of motor vehicle emissions under City driving conditions, field investigations and control of hazardous wastes and research and development activities for the Department.

Since the mid-seventies I have been either member or consultant to the Science Advisory Board serving on its Air Quality Criteria, Environmental Measurements and Environmental Health Committees and a number of subcomittees including the one on Research Outlook.

Therefore, I have had experience from a variety of viewpoints-from pure science and technology issues to one-on-one encounters with the public, its problems and complaints-from the front lines of environmental control to advisory boards reviewing ongoing and proposed scientific programs.

A neglected area of research is one where the goal is to facilitate acceptance by the public of measures deemed necessary by government for the protection of both the environment and human health. The most important phase of environmental protection-the implementation of control strategies or actions-has had to depend upon the inventiveness of local proponents with little guidance from the national government. Therefore, a strong, well-defined research program that provides state and local officials with guidance and support in the front lines should be a national priority.

The federal government should provide leadership and funding for research and development programs that will:

- improve the quality of technical information and the credibility of those who release it to the public;
- provide criteria and guidance for the public to use in the evaluation of proposed environmental control actions;
- develop methodologies and guidance for obtaining an understanding of local concerns and priorities and how they relate to environmental problems.

Although a greatly improved capability to measure and monitor all phases of the environment for contamination is necessary to gain credibility, the objective of this research program cannot be achieved through science and technology alone. Socioeconomic, political and motivational expertise should be introduced as important components of the research program.

The "cradle to the grave" strategy for controlling hazardous wastes was not accompanied by a research and development program of the magnitude that was needed to make possible and prepare the required disposal facilities. Therefore, our increased capability to find and identify hazardous wastes is not matched by a similar capacity for the destruction or deactivation of wastes. Moreover, the public was not prepared to accept the siting of new disposal technology because we do not have the understanding of how to approach the public on such subjects nor does an agency exist with the credibility to provide the needed reassurances.

Disposal of wastes is a critical problem for urban areas. New York City, for example, is faced with increasingly severe constraints in its ability to dispose of both sewage treatment and municipal waste. The City wants to safeguard the surrounding environment but it already carries the burden of an expensive low-sulfur fuel program to protect the surrounding and regional air environment. It is not fiscally capable of experimenting with technology untried at the scale required by large urban centers for disposal of wastes. It cannot make major capital investments nor add significantly to its operating budgets for programs wherein long-term workability and environmental adequacy cannot be guaranteed.

There are unanswered questions about disposal of urban wastes that warrant major research and development programs. The technological and economic feasibilites and the environmental acceptability of various methods of disposal of sludge on land, at sea or by combustion are issues of national importance that need to be researched and demonstrated on a realistic scale by the federal government. There exist a variety of processes at different stages of development for the conversion of sludge and solid wastes into solid, gaseous or liquid fuels which must be investigated from an objective viewpoint and demonstrated on a full scale before they can be adopted by any prudent municipality as its long term solution.

A serious complication of recent origin is the potential for generation of dioxins during the combustions of wastes. Until the federal government produces credible research on how dioxins are produced during combustion of wastes, the effectiveness of control measures, the persistence of the substances in the environment and most importantly, the safe levels of exposure, even a technology as well established as incineration may become unavailable for the solution of the urban waste disposal problem.

Municipalities are finding hazardous wastes that were buried in the past where dense populations now exist. Such discoveries cause concern both to nearby residents because of the bad publicity given the handling of hazardous wastes and to the local government who must act to reassure their communities.

For example, the City of New York found a substantial deposit of underground contaminated oil at a site where it had completed an extensive cleanup of hazardous wastes above ground. Consultation with experts to identify the most effective technology for environmentally safe removal of this waste has indicated to us that important research is still needed before this problem can be handled appropriately. In fact, scientists for U.S. Geological Survey consider this site an excellent location for the type of research that would produce the required methodology.

New York City encounters similar problems because of the need to excavate to provide services or erect structures. A difficult dilemma arises when the providing of very necessary services, such as sewers to a community, involves excavations where there is a community concern about the possible presence of hazardous materials.

A related issue arises when long-buried wastes containing hazardous constituents are discovered where there is no immediate need to disturb the area. Several questions require research by the federal government at an accelerated and intensified pace if we are to provide better answers and greater assurance than we now give these situations.

How do we determine with sufficient reliability to reassure reasonable individuals whether or not hazardous wastes:

- are present underground in significant quantities;
- are affecting the surrounding air and water environment;
- are being detoxified by natural processes without significant harm to the environment and should be left undisturbed?

An effort by the federal government to develop criteria, guidelines and procedures for such situations would be most welcome.

Densely populated metropolitan areas, especially those with tall buildings, canyon streets and heavy traffic in the past have not received the research attention they merited. Examples of the lack of emphasis on urban problems are found in the driving cycles used to test emission rates from vehicles and the slowness of the development of computer models for simulating the diffusion of pollutants emitted by vehicles within canyon streets or of pollutants emitted from tall stacks in the vicinity of tall buildings.

A few of the questions that require better answers through additional research are:

How do emissions from gasoline and diesel vehicles behave within canyon streets?

What level of exposures are motorists and pedestrians receiving from these emissions?

How are the plumes released from tall stacks affected by tall buildings in the immediate vicinity?

Are residents in tall buildings with open windows or air intakes at high altitudes receiving higher exposures than those calculated by existing models?

Computer models are the tools we use to determine how sources affect air quality and the benefits to be achieved by their control. Notwithstanding the number of years during which commitments have continued to be made to control sources of volatile organic compounds, the models necessary to quantify the benefits in terms of reduced photochemical oxidant levels are still far from adequate. An accelerated program for development of these air quality simulation models and our understanding of the chemistry involved will improve our effectiveness and lower the price we must pay to achieve this standard.

A steadily increasing use of diesel engines both for motor vehicles and for stationary sources has generated concern about the future quality of the air environment of the cities.

Experiences in foreign cities with high percentages of diesel vehicles justify this concern with respect to odors and the concentrations of suspended particulate matter and thus visibility and soiling. We are especially anxious that questions about the adverse health effects of diesel emissions be answered with authority because living in a city often leads to very high exposures to diesel emissions for both motorists and pedestrians.

Cities such as New York have made great improvements in air quality, however, we are receiving an increasing number of complaints about the quality of indoor air. It is even possible that exposure to indoor air pollution is now a more serious problem than outdoor pollution, nevertheless, there is little effort at the national level to investigate. This is a national problem that is growing along with efforts to conserve energy and the introduction of new materials and products into indoor space. Studies of the adverse health effects of outdoor air pollution on populations will be confounded as long as the nature and extent or indoor air pollution and its effects on health are not quantified.

Mr. **Scheuer**. Thank you very much, Dr. Ferrand. You answered several questions I was going to address to you in your testimony, which was excellent. We appreciate the effort you made to get here.

Mr. Nosenchuck, EPA contends, and I think you have answered this too and to a certain extent this is redundant, but my colleagues who aren't here I want to get the answers clearly on the record.

EPA contends that industry should and will develop the alternative disposal technologies for hazardous wastes, because they have the incentive and resources to do so.

Do you agree that they have the incentive as well as the resources, and as a corollary to that, what research do you think EPA should perform to develop and encourage the use of alternative waste disposal technologies?

After Dr. Nosenchuck answers that, any of you can add something.

Mr. **Nosenchuck**. The industry has the resources, but do they have the incentive, no; clearly no, and only if they want to use their resources.

Mr. **Scheuer**. Why don't they have the incentive?

Mr. **Nosenchuck**. Industry doesn't have the incentive because right now, with the policy that is existing, landfilling is the appropriate technology which the national policy purported by EPA, that is the least cost to dispose of hazardous waste.

Industry clearly is looking, unfortunately, in this area like in many other areas, at the bottom line. Why should any particular industry dispose of hazardous waste in a more appropriately and environmentally sound manner that might cost them a lot more money?

Incineration costs a lot more than landfilling—a lot more. So, until the industry is required to develop other technologies, they are not going to do it. That is why I have said it is my judgment that the only way this is ever going to happen is by establishing in law a regulation a date certain by this point in time, gentlemen, in effect to industry, these types of waste will no longer be allowed to be disposed of in the land. Then, industry will develop the technologies, and there are many good technologies out there right now.

However, why should a particular industry in one State invest its money for this, say, destruction technology, when in another State a couple States over landfilling is still acceptable. It puts them at an economic disadvantage. So, it is my opinion, shared by many other people, until this happens, until it is in the law, where law and regulation, you are going to continue to see landfilling being utilized. That clearly is not the best way to dispose of many wastes.

I believe the resources are there. Industry has the resources, but they need a prod. They have to have the desire to do it, and it has to be really uniform around the country.

I think I answered that clearly.

Mr. **Scheuer**. Does anybody wish to add to that?

Dr. **Ferrand**. I think the other factor is that there is a lot of hazardous waste in the cities, and its surroundings, which has been there for many, many years. It would be hard to make this the problem of industry.

As you said before, the cities and the municipalities are right there. They have to face up to this problem and find a way to do something with hazardous wastes. That certainly isn't going to be done by industry.

Mr. **Scheuer**. Do we have sufficient information at the present time to establish appropriate national standards for control and disposal of hazardous waste? If we don't, what specific research is needed to establish such standards?

Mr. **Nosenchuck**. Well, first I believe we have enough information to determine those types of waste that should go into the ground and should not go into the ground. Additional research is clearly needed in certain areas. Those wastes which are mobile in the soil environment need a lot more research of attacking of wastes on the liner. See, they are on clay liners, manmade liners; they should be explored.

I don't think there is any question based on many hours of testimony before your committee, Mr. Chairman, that there has been a determination that wastes will attack liners. Research is needed there. You have to determine what wastes would be compatible with the liners in the soil environment.

These are the areas—those wastes which are highly toxic or carcinogenic, and I think we have a fair idea of what those are. Those should not be deposited in the land. There are other methods of destroying it, and I believe, again, the only way to do this is just by making a certain policy statement. A national policy determination has to be made. .

First, these wastes will no longer be buried in the land. Two, by this date these types of waste have to be handled by other methods—tried and true and proven methods. EPA should serve as a technology transfer point to share the technology with all the States, with all the industries, as a common point of just referring information and doing whatever exotic research is needed.

This is where they are walking away from, because they have determined—it is a policy—the policy is landfilling is adequate.

I submit that that is a wrong policy.

Mr. **Scheuer**. Do you have anything to elaborate on?

Dr. **Ferrand**. I think the technology for disposing of wastes is there. I agree that putting the stuff in the ground should be the last resort and should be restricted only to those hazardous wastes that can't be handled any other way.

For example, at sea incineration is, I think, well developed. Again, the problem there is that there is no place to put the facility that the public will accept. I worked on this problem last year. I was on leave for about a month working with the Mount Sinai people who were trying to develop a package for an at sea incineration operation. In spite of the technology being there and all the care that can be taken this project is not getting off the ground because nobody wants it in their backyard. There is no one with enough credibility to tell them that this has to be put there and this is safe—even when it is. We have got to learn how to do that.

Mr. **Scheuer**. Yeh. Mr. Wood.

What is your evaluation of the nature and extent of parent and projected air pollution problems caused by energy development activities? What research should EPA conduct in this area and why?

Mr. WOOD. Mr. Chairman, the State of Wyoming has undergone an energy boom since the early 1970's. As you may well be aware, the State of Wyoming contains something like 20 percent of the total U.S. mineable coal deposits. Those are certainly destined for energy production.

The energy production research and development question gets back to some of the comments that I made earlier. Control technology development is one of those areas that is extremely important to the air pollution control program. We can look backward for the past 8 to 10 years to scrubbers.

Everyone has talked about how bad scrubber was, how it doesn't work. We have scrubbers that were installed in 1967. We have scrubbers that are being installed today on very large powerplants for the scrubbing of even low sulfur coal.

Without the EPA research and development program on scrubbers, that would have never been possible. It would not have been possible to limit SO_2 emissions to the point that we have today. I think we are getting to the same point with such things as the LIMB program, that is referred to in EPA's budget analysis. We are getting more and better information on the conventional energy facilities.

There is, however, more research that needs to be done in many areas. In the area of the more sophisticated energy production facilities, such as synthetic fuels plants, which may or may not come about. I think we have to prepare very carefully for these.

There is very little existing information and there is very little research being done on emissions from such synthetic fuels facilities. We are not in good condition at all to review those kinds of facilities and make decisions as to whether we have acceptable levels of ambient air pollutants, and whether we have acceptable control technology.

So, the area of control technology development for the synthetic fuels plants, is extremely important. It is an area in which we have attempted to get information from EPA, over the past 2 years. EPA has promised on many occasions that such research is being accomplished and that the data and information will be forthcoming. This has simply not been the case.

Mr. SCHEUER. Given what we know about acid rain research program, given what we currently know about acid rain, do you believe that control measures are justified at this time in the context of total linearity, as you scientists tell us of a one-to-one relationship—a cause and effect relationship—between a possible reduction of emissions perhaps in the Ohio River Valley and a reduction of polluting effects a thousand miles away.

Do you believe that, in the present state of our knowledge—taking the present state of our knowledge as a given—that any level of regulation of the Ohio River Valley, smokestack industries, and others, is justified?

Dr. WOOD. I think a great deal depends upon the point in time that we find ourselves in. I think that we are at a point in time when we don't have the linear relationship which you refer to established. We can't say with confidence that a given reduction of SO_2 emissions or NOX emissions in the Ohio River Valley is going to result in a given reduction in pH or an increase in pH in the Northeast.

The bulk of the scientific information that we have, simply tells us that acid rain is a problem, and it tells us without this third decimal place answer what the cause and effect is. I honestly believe that efforts toward control of acid rain are needed, and they are needed now.

If we wait until we have that answer to the third decimal place, it may well be too late. Let me try to put my answer into perspective. Back in the early 1970's, States were required to develop implementation plants for areas that were not in compliance with particulate matter or SO_2 standards.

That has been a tremendous process, and as you are well aware, this body has engaged in much discussion on the question of why we didn't meet the requirements that were specified. Why are we not meeting the ambient standards?

It is simply because we got so far behind. We got so far behind that I don't know that we will ever make it up in our research as well as in our control technology. I guess the parallel point here is how much further behind, in terms of SO_2 emissions and acid rain, can we get and still catch up?

Mr. SCHEUER. So, you are saying, in effect, that we can't wait until we know everything before we do anything.

Mr. WOOD. Precisely.

Mr. SCHEUER. Mr. Weaver. To what extent do nonpoint sources contribute to the Nation's water pollution problems and what research do you think EPA ought to be doing in this area?

Mr. WEAVER. I think, Mr. Chairman, that it is recognized that nonpoint sources do make an appreciable contribution to the Nation's water pollution control problem. They have, even though there was a concerted effort to concentrate on this area through the section 208 program provided for in the Federal Water Pollution Control Act, and that a number of control programs have emanated from that, the cutoff of that effort leaves a considerable amount, yet, to be attained.

The control programs—again the application of what is the significant impact—has not really been zeroed in on in a number of areas. It is an area I can say, for certain, is not being satisfactorily addressed in my view in the Ohio Valley, for example. There is no question in my mind about it.

If I may, I want to add one thing, Mr. Chairman, about the matter of—there are a number of things that were brought up here. One item that I would like to emphasize that came back from the survey of the State agencies was the need—the overwhelming comment for the need—for the States to have a voice in the development of the priority system that the agency has in its research program.

That was emphasized.

In another aspect, there was a comment made here about national standards, and I think it would be well to mention in the record, for example, ASIWPCA has gone on record as opposing national standards in some of these areas. I would like to state that we were talking about a conventional area.

For example, dissolve oxygen requirements which might be necessary to achieve the purposes of the purposes of the Federal act, which might be somewhat different on the Ohio River as opposed to Lake Michigan or to a bayou in Louisiana.

But, when we get to the area of toxics, then we are talking about a new ball game. The association has worked on what we call life after best-available technology, and it has received a good deal of support in the environmental community—a program called toxicity elimination management strategy in the clean water program. This is an approach to getting a handle on toxics control.

Mr. **Scheuer**. Talking about toxics, the research on control of such toxics as dioxin, PCB's, and furans is neglected in my view in the EPA budget proposal, apparently because the administration hasn't developed a regulatory position on these chemicals. Is this a case of, you know, which comes first—the chicken or the egg?

What research and development should EPA be doing on these very special and very toxic chemicals, and what should this regulatory policy be?

That is the second bell, and I am going to have to leave in about 3 minutes, so this will be the last question.

Mr. **Weaver**. You have asked a question that is extremely important.

Mr. **Scheuer**. You respond to the record, and I am going to leave in about 3 minutes because the second bell just ran on a rollcall vote on the floor of the House.

But, you can continue after I leave, and I am also going to hold the record open for any additional comments you might have to make, and we may have some written questions for a few of you, so we will hold the record open for about 10 or 12 minutes. Please proceed.

Mr. **Weaver**. Again, I am giving you an opinion now. This is not necessarily a representative response from ASIWPCA, but there seems to be a lack of direction in these areas in the Agency.

I am talking about the Federal Agency which we have to look to for these kinds of answers. The lack of direction, and again I would put this opinion forward, Mr. Chairman, is because of the direction or lack thereof of certain of the background and the facts that are needed to establish these directions.

I think that is the basic tentative problem.

Mr. **Scheuer**. All right. Thank you very much. It has been an extremely helpful hearing, and all of you have testified very thoughtfully and very professionally, and we appreciate it very much.

We will undoubtedly have some questions that we will submit to you by mail, and we thank you very much for your patience. Thank you.

Mr. **Weaver**. Thank you, Mr. Chairman.

Mr. **Scheuer**. With that, the hearing is adjourned.

[Whereupon, at 12:10 p.m., the hearing was adjourned, to reconvene at the call of the Chair.]

FISCAL YEAR 1984 EPA RESEARCH AND DEVELOPMENT AUTHORIZATION

WEDNESDAY, APRIL 27, 1983

House of Representatives,
Committee on Science and Technology,
Subcommittee on Natural Resources, Agriculture
Research and Environment,
Washington, D.C.

The subcommittee met, pursuant to recess, at 2 p.m., in room 2318, Rayburn House Office Building, Hon. James H. Scheuer (chairman of the subcommittee) presiding.

Present: Representatives Scheuer, Brown, Valentine, McGrath, Schneider, and Chandler.

Staff present: Anthony Clark, technical consultant; Mary Beth McJury, minority technical consultant.

Mr. Scheuer. The subcommittee will come to order.

Today the Subcommittee on Natural Resources, Agriculture Research and Environment concludes formal hearings to consider the fiscal year 1984 budget request for the research programs of the Environmental Protection Agency.

Our first witnesses will be Dr. Richard Dowd from Environmental Research and Technology, Inc., and Dr. Clarence Davies from the Conservation Foundation, who will discuss overall EPA research policy.

They will be followed by Dr. Bruce Karrh, representing the Chemical Manufacturers Association, and Dr. Ellen Silbergeld of the Environmental Defense Fund, who will address the health effects of hazardous waste.

Both of these organizations have initiated legal actions against the Environmental Protection Agency and the Department of Health and Human Services for failure to undertake health studies associated with hazardous waste which is required under Superfund.

It is not often that these two organizations take the same side on an issue. Their joint action indicates a strong need to proceed with hazardous waste health studies, and we will hear what they have to say about this matter today.

Our final witness this afternoon will be Dr. Richard Rowberg of the Office of Technology Assessment, who will discuss energy development and related environmental problems, including acid rain.

Gentlemen, let me thank you for being here today.

Before we begin, I would like to turn to the ranking minority member of the subcommittee, Ray McGrath of New York, for any opening remarks he may wish to make.

Mr. **McGrath**. Thank you. I ask unanimous consent to insert a statement in the record at this point.

Mr. **Scheuer**. Without objection.

[Opening statement by Mr. McGrath follows:]

HONORABLE RAYMOND J. MCGRATH
OPENING STATEMENT FOR HEARING ON FY'84 EPA R&D AUTHORIZATION
APRIL 27, 1983

I WANT TO JOIN THE CHAIRMAN IN WELCOMING OUR WITNESSES HERE TODAY.

I AM SURE THAT THE TESTIMONY OF THESE WITNESSES WILL BE QUITE VALUABLE TO THE MEMBERS OF THE SUBCOMMITTEE AS WE MAKE DECISIONS ON THE FY 1984 EPA BUDGET.

I WANT TO ADD A SPECIAL WELCOME TO CONGRESSMAN COOPER EVANS WHO WILL TELL US ABOUT A VERY SPECIAL PROGRAM WHICH HE HAS INITIATED. I HAVE READ THE DRAFT OF YOUR AMENDMENT, AND I WANT YOU TO KNOW THAT IT WILL HAVE MY SUPPORT IN THIS SUBCOMMITTEE.

THE RECENT CONTROVERSY SURROUNDING THE ENVIRONMENTAL PROTECTION AGENCY HAS INDICATED TO US THAT WE MUST BE ESPECIALLY CONSCIENTIOUS IN OUR OVERSIGHT AND BUDGET DECISIONS AFFECTING THE AGENCY. IT IS IMPERATIVE THAT WE REVIEW THE R&D PROGRAM WITHIN THE EPA TO ASSURE THAT WE ARE PROCEEDING IN THE PROPER DIRECTION WITH THE LEVELS OF FUNDING WHICH WILL ENABLE EPA TO CARRY OUT ITS MANDATE.

WE HAVE, AS YOU SAID, MR. CHAIRMAN, SEVERAL HIGHLY QUALIFIED WITNESSES BEFORE US TODAY. I THANK THEM FOR COMING AND LOOK FORWARD TO THEIR TESTIMONY AND CONTRIBUTION.

Mr. SCHEUER. My colleague from Rhode Island, Mrs. Schneider.

Mrs. SCHNEIDER. I have no opening statement, thank you, Mr. Chairman.

Mr. SCHEUER. Congressman Brown of California?

Mr. BROWN. I have nothing at this time, Mr. Chairman.

Mr. SCHEUER. Then we will proceed with the witnesses.

Your prepared testimony will be printed in the record. We suggest you proceed informally for 7 or 8 minutes each, after which I am sure we will have questions of you.

Dr. Dowd, why don't you begin?

STATEMENT OF DR. RICHARD M. DOWD, MANAGER, POLICY ANALYSIS DIVISION, ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC.

Dr. DOWD. I am Richard Dowd, manager of the Policy Analysis Division of Environmental Research and Technology, Inc. I served as the acting assistant administrator for research at the Environmental Protection Agency from November 1980 through June 1981.

In addition, I was the executive director of the Science Advisory Board and the Science Policy Adviser to the Administrator from 1977 through 1981.

I have previously acted as the Chief Scientist for Energy, Environment and Natural Resources in the Congressional Budget Office and as assistant commissioner for policy planning and research in the Connecticut Department of Environmental Protection.

In addition, I spent 5 years as assistant professor of physics at Tufts University. My testimony reflects my professional judgment.

Mr. Chairman and members of the committee, today I would like to discuss three aspects of EPA's research program. The first is the effect of the fiscal year 1983 and fiscal year 1984 budget on the research program at EPA.

Second, I would like to discuss the need for EPA's leadership in environmental research.

Third, I would like to discuss some specific areas where this leadership is needed now.

First, I would like to discuss the effect of this year's budget on EPA's R&D. The Agency's overall research program continues to shrink. In my view, this seriously reduces the ability of the Agency to mobilize academic and other institutional scientists outside of EPA to work on environmental issues of concern to the Agency and to the Nation as a whole.

This reduction continues a trend that has reduced extramural funding from $195 million in fiscal year 1981 to the proposed $111 million for fiscal year 1984. This $111 million is less than 45 percent of the 1981 funding when measured in 1981 dollars. This continued reduction in funding has accompanied an increase in the complexity of issues facing the EPA today, such as whether toxic chemicals in the ambient environment are hazardous, how they move and how they are transformed.

The second issue of great concern is this year's continued reductions in Agency personnel. At present, the Agency has about 1,500 scientists, engineers, and program administrators to run the research program. The proposed level for fiscal year 1984 is a ceiling level of 1,150.

The reduction from 1,500 to 1,150, therefore, from the present onboard strength to the proposed ceiling for 1984, is a reduction in staff of nearly 25 percent. That 25 percent cannot be taken solely from EPA's headquarters; it must come out of laboratories spread throughout the Nation.

One cannot expect to have a stable, efficient program in which the experience and skill level remain high, when 25 percent of the staff are being eliminated. A good, high-quality research staff is the sine qua non of a good research program.

The fiscal year 1984 budget would reduce that level so much as to significantly debilitate it. A commitment to high-quality research and science must be more than political rhetoric. It must be followed by an allocation of resources both in dollars and in personnel. It has never been more important than at this time to build a strong research capability, to maintain and strengthen the staff, at the very least, at its present level, and to restore some of the budgets that have been reduced.

From my observations of the Agency and its activities, one can characterize the need for scientific leadership in three areas.

The first is in gathering information on strategic or exploratory issues. Examples of such research are: human exposure to indoor air pollution; the determination of when ecological systems have been significantly impaired; measures of nonacute, noncarcinogenic health effects; the development of a baseline measurement system; and an inventory of national ground water quality and quantity.

The second broad area is the development of information that is important to EPA's regulatory programs. Examples include:

Information necessary to determine whether or not a chemical can be classified as a hazardous air pollutant;

The determination of whether or not the priority pollutant list is adequate and what kinds of effects, at what levels, those chemicals have upon aquatic organisms and human health;

The determination of the appropriate levels of pollution control that are possible and available;

The determination of whether or not acid precipitation is, in fact, formed in the atmosphere, what causes its formation, and what are controlling conditions;

The determination of clinical effect levels for respiratory illnesses from air pollution at ambient levels;

The determination of whether or not ambient levels of conventional air pollutants are hazardous to people;

The health of ecological systems; and

The determination that the data collection—for example, measurement—methods applied meet quality control standards necessary for the enforcement of the Nation's environmental laws.

Each of these information needs has different research and development requirements. Obviously, the strongest are the first two categories. There is and has been a tendency, in all of EPA's administrations, to emphasize R&D directly related to regulations, which is obviously important and ought to receive the lion's share of available resources.

However, these regulatory programs should not become the exclusive, driving force in budgetary decisionmaking. In fact, over the past several years, we can see that when relevancy to regulatory programs has determined the research agenda, serious and significant problems have developed.

While a research agenda must be pointed in the right direction and calibrated by program needs and demands, a true research agenda must be established by the data gaps that exist; data gaps that researchers, if they are good, know exist and seek to fill.

A good example of this is the present lack of attention to the data underlying water quality criteria for the priority pollutants. From a regulatory program point of view, most of the water quality criteria have been established. The documents have been produced, published, and are available for public review. From this program's perspective, the Agency need not allocate more resources to research involved in water quality criteria.

The difficulty with that view is that it is wrong. While it is true that the documents have been completed, it is not true that they are adequate. In fact, if one looks beneath the surface of the water quality criteria documents, one finds severe criticism by a broad spectrum of interest groups from the industrial community, academic scientists, and the environmental community.

The fact is that, through no fault of the Agency, there was simply not enough information on which to base scientifically valid water quality criteria. The best was to compare and contrast a few experiments on a host of chemicals.

The majority of water quality criteria are simply inadequate as guidelines for water standards for either health or for aquatic effects. Several of the researchers working on the preparation of them remarked that they had actually developed a terrific research agenda for the development of defensible water quality criteria.

One of the major goals of water quality research at EPA, in my view, should have been to attempt to close the data gaps and close them quickly. The research involves assisting States and local governments in making site-specific applications of existing water quality criteria.

It is ludicrous to assume site-specific applications are possible when there is simply not enough data to have scientifically sound water quality criteria. At least 2 years have been lost in creating the scientific base on which the Agency's credibility must rest with regard to protecting water quality.

While I was previously committed to the bottoms-up process of budgetary and research planning, in retrospect, it allowed too strong an influence by EPA's program offices. I believe that major budgetary decisions should be made by the researchers with adjustments and corrections made by the program offices.

Now, I would like to turn attention to particular areas within environmental research where leadership by EPA is very important. One of the most important of these areas is that of new pollutant control technology.

The Environmental Protection Agency's fiscal year 1984 budget makes explicit the policy that the Government should not be carrying out research on technologies where industry has demonstrated an interest. Since the cost of cleaning up and the cost of control can materially affect the final level of control, the Government has equal responsibility and interest to help establish efficient, new control technologies which may be more economical and equitably applied.

It is essential that substantial cooperation take place. This is one of the areas where, in my view, EPA has been most successful. A good example of this is the limestone-injected multistage burner, which represents a major addition to the technologies available for reducing pollutants from combustion. Industry has a complementary interest in assuring that efficiencies are attained at reasonable cost.

These two objectives are complementary with respect to the development of new pollutant control technology. LIMB is not unique in this respect. There are other opportunities where fruitful cooperation could take place between EPA and industry.

However, they create a need for additional resources and, most importantly, additional personnel who would seek out productive opportunities in industrial science and engineering. In the case of control technology now, however, there are few if any new endeavors because of the great reduction in personnel and funding.

In this area of control technology, there is another set of technologies which are very high on the Nation's priority list and which require the Agency's attention. Hazardous waste engineering has had very little effort expended on it by the Agency over the last 10 years. In my view, it is in desperate need of additional research. If EPA does not support it, there is little likelihood other agencies will.

For example, high temperature incineration of wastes requires good engineering, not only for traditional incinerators but also for other very high temperature destruction methods such as the plasma arc and molten salt. Right now, there are very few hazardous waste sites approved for disposal in the Nation.

Without a substantial effort by EPA and the regulated industry, it is quite possible that in the future we will simply use existing sites, with interim operating permits converted to permanent permits. A demonstration project would help to accelerate the cleaning up of many obsolete disposal sites.

A second broad area for research leadership in the Agency's research program is the ecological studies. Within the Federal Government, EPA is the only agency particularly interested in carrying out research on ecological and environmental issues of this kind. Many academic scientists have no support other than EPA.

The Agency should be carrying out major and substantial programs in population, stresses upon them, and when those impacts become critical. This kind of leadership should have predated, for example, concerns about acid precipitation. The Agency should be carrying out research on soils and the impact of acid precipitation, the interchange between soil systems and aquatic systems.

Specifically, work on the toxicity of impacts on aquatic organisms needs to be accelerated. At the moment, the Agency is only reviewing, as I mentioned before, methods for site-specific evaluations rather than direct research on toxic impacts on aquatic systems. If EPA does not have a major program plan to do research in ecological systems and pollutant effects, it is unlikely that any other agency will.

The atmospheric physics and chemistry of pollutant interactions is a subject in which EPA has a fairly clear, unique, and obvious leadership role. The issues of long-range transport, far more than simply acid precipitation, ought to be more strongly supported in an agency research program.

In general, the research program for the agency on atmospheric pollutants tends to follow a cyclical funding pattern, with increases in research just before criteria documents are needed for review by the outside world, and then a decline until the next criteria documents are due.

This is the wrong strategy. Increased research ought to be undertaken far ahead of the criteria documents so that results are ready for inclusion in each document.

Similarly, the Agency needs not only to review the aquatic effects of pollutants, but it also needs a substantially increased R&D program in the fate, transport, and movement of pollutants through aquatic systems.

Health research is really quite different from the other programs in control technology, ecology, and physics and chemistry of pollutant movement. Here the Agency depends a great deal on the work done by and for other agencies such as the National Institute of Environmental Health Sciences, the National Center for Toxicological Research, and the national tox program.

EPA for some years provided funds to the National Center for Toxicological Research at Pine Bluff, Ark. The funds allowed EPA to influence the direction of much of the Center's research. I would not argue that this research should be substituted for what remains of the Agency's health research efforts, but it is highly useful to maintain Agency intput to this broad array of research.

In the area of health research, there are some key areas. The development of methods to assess health effects is critical—methods that are quicker and less expensive to use.

Air inhalation toxicology should be strengthened and expanded. The Agency presently has a very substantial and well-respected leadership position in nonionizing radiation health effects research. While at the moment these efforts are not a high priority, it is an area in which the Agency's research budget in the past constituted nearly 25 percent of all the research in the Nation.

I think you will find, Mr. Chairman, that the program continues to be highly respected. The program is now under threat of being abandoned. This is due in part because it does not appear that nonionizing radiation poses an immediate health threat.

The growth of the electronics and the communications industries related to nonionizing radiation, microwaves, et cetera, however, is continuing to grow at a rapid pace. While it appears that the general level of microwave radiation at present is far below densities where health effects may be of concern, it is only through the support and encouragement of this kind of research that we assure ourselves in the future that public health will not be at risk.

The research and development program ought to be a leader in the area of monitoring pollutants throughout the environment. Of first concern is data quality assurance. If one does not know the quality of the data, one does not know its significance. EPA's quality assurance program presently under way in ORD is improving. It should be fortified with resources to maintain its usefulness to all of EPA's programs.

The fundamental problem of monitoring pollutants is the lack of meaningful, significant data for many substances. This is true in old networks and in new ones. The old networks represented by the standard water quality network and the standard air quality network that deal with what one might call conventional pollutants have a very difficult time working with States and local governments.

The quality assurance program's problems are legion. I understand that this committee may be addressing some of these issues in the near future. The old networks are dispersed among all the program offices of the Agency, and that provides problems, too. For new networks measuring toxics, the Agency has not really begun to produce a system that is widely available.

There is one exception. Recently, largely at the prompting of the Office of Management and Budget, the Office of Research and Development has established, and now operates, an inhalable particulate network. This network separately measures fine and coarse particulates and eleven metals present in the air. This is the first of the new networks to measure potentially hazardous air pollutants.

I have had the opportunity to review some of the data collected through this network. They appear to be accurate. The Agency's quality control in managing and operating the network is excellent. Definite quality control standards have been applied in obtaining early results.

While data gaps still exist as the network is still being developed, these efforts are representative of the kinds of networks that need to be established in the future. The Agency should enhance its leadership position by setting up new networks for measuring atmospheric volatile organic compounds and priority pollutants in water in a consistent and coherent way, perhaps in cooperation with industry. This, of course, cannot be undertaken without encouragement, without resources, and without personnel.

Over the last decade, we have been constantly hit with crisis after crisis over where we have substantially impacted various ecological systems. The recent acid rain debate is typical. We desperately need a broad baseline of data on which to evaluate whether effects are taking place so that, a decade from now, we would be able to see trends in ecological health and environmental values to determine whether or not we are cleaning up and protecting the environment.

Such a baseline network has not been established, and it is not likely to be established unless major responsibility is delegated to the Agency.

In summary, Mr. Chairman, I believe the key leadership areas for EPA's R&D lie in developing new control technology, greater understanding of ecological systems, pollutant transport and fate, and work on the aquatic effects of pollutants.

Specific programs in health research, such as air inhalation toxicology and methodological developments, need support. The development of monitoring systems to establish new indices of the Nation's environmental health will continue to be important. Without good data, Agency policy policymakers cannot make rational and defensible decisions.

To assure that needed information is available, EPA's research program must exercise a role of leadership in many of these key areas. Such leadership requires talented, expert Agency managers and scientists with the know-how to implement R&D programs as well as sufficient dollar resources for their mission.

In my view, both of these requirements, people and money, require substantial, not marginal, increases in the EPA budget in the areas that I have discussed. I urge you to consider the budget that EPA had 2 years ago, close to $200 million for R&D and over $100 million for salaries and expenses, as a goal for this year.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Dowd follows:]

Testimony of Richard M. Dowd, Ph. D.

My name is Richard M. Dowd. I am currently Manager of the Policy Analysis Division of Environmental Research and Technology, Inc. I served as the Acting Assistant Administrator for Research at the Environmental Protection Agency from November 1980 through June 1981. In addition, I was the Executive Director of the Science Advisory Board and the Science Policy Advisor to the Administrator from 1977 through 1981. I have previously acted as the Chief Scientist for Energy, Environment and Natural Resources in the Congressional Budget Office and as Assistant Commissioner for Policy Planning and Research in the Connecticut Department of Environmental Protection. In addition, I spent five years as Assistant Professor of Physics at Turfs University. My testimony reflects my professional judgment.

Mr. Chairman and Members of the Committee:

Today, I would like to discuss three aspects of EPA's research program. The first is the effect of the FY 1983 and FY 1984 budget on the research program at EPA. Secondly, I would like to discuss the need for EPA's leadership in environmental research. Thirdly, I would like to discuss some specific areas where this leadership is needed now.

First, I would like to discuss the effect of this year's budget on EPA's R&D. The Agency's overall research program continues to shrink. In my view, this seriously reduces the ability of the Agency to mobilize academic and other institutional scientists outside of EPA to work on environmental issues of concern to the Agency and to the nation as a whole. This reduction continues a trend that has reduced extramural funding from $195 million in FY 1981 to the proposed $111 million for FY 1984. This $111 million is less than 45% of the 1981 funding when measured in 1981 dollars. This continued reduction in funding has accomplished an increase in the complexity of issues facing the EPA today, such as whether toxic chemicals in the ambient environment are hazardous, how they move and how they are transformed.

The second issue of great concern is this year's continued reductions in Agency personnel. At present, the Agency has about fifteen hundred scientists, engineers, and program administrators to run the research program. The proposed level for FY 1984 is a ceiling level of 1,150. The reduction from 1,500 to 1,150, therefore, from the present onboard strength to the proposed ceiling for 1984 is a reduction in staff of nearly 25 percent. That 25 percent cannot be taken solely from EPA's headquarters; it must come out of laboratories spread throughout the nation. One cannot expect to have a stable, efficient program in which the experience and skill level remain high, when 25 percent of the staff are being eliminated. A good, high-quality research staff is the sine qua non of a good research program. The FY 1984 budget would reduce that level so much as to significantly debilitate it. A committment to high quality research and science must be more than political rhetoric. It must be followed by an allocation of resources both in dollars and in personnel. It has never been more important, than at this time, to build a strong research capability—to maintain and strengthen the staff, at the very least, at its present level, and to restore some of the budgets that have been reduced.

From my observations of the Agency and its activities, one can characterize the need for scientific leadership in three areas.

The first is in gathering information on strategic or exploratory issues.

Examples of such research are:

—human exposure to indoor air pollution;

—the determination of when ecological systems have been significantly impaired;

—measures of non-acute, non-carcinogenic health effects;

—the development of a baseline measurement system;

—an inventory of national ground water quality and quantity.

The second broad area is the development of information that is important to EPA's regulatory program. Examples include:

—information necessary to determine whether or not a chemical can be classified as an hazardous air pollutant;

—the determination of whether or not the priority pollutant list is adequate; and what kind of effects, at what levels, those chemicals have upon aquatic organisms and human health:

—the determination of the appropriate levels of pollution control that are possible and available;

—the determination of whether or not acid precipitation is, in fact, formed in the atmosphere, what causes its formation, and what are controlling conditions;

—the determination of clinical effect levels for respiratory illnesses from air pollution at ambient levels;

—the determination of whether or not ambient levels of conventional air pollutants are hazardous to people;

—the health of ecological systems; and

—the determination that the data collected (e.g. measurement) methods applied meet quality control standards necessary for the enforcement of the nation's environmental laws.

The third area of information needs in EPA, is the whole area data analysis. It requires a major infusion of talent and skill from such diverse disciplines as statistics, quality control, ecology, and health research.

Each of these information needs have different research and development requirements. Obviously, the strongest are the first two categories. There is and has been a tendancy, in all of EPA's administrations, to emphaisize R&D directly related to regulations, which is obviously important and ought to receive the lion's share of available resources. However, these regulatory programs should not become the exclusive, driving force in budgetary decision making.

In fact, over the past several years, we can see that when relevancy to regulatory programs has determined the research agenda, serious and significant problems have developed.

While a research agenda must be pointed in the right direction and calibrated by program needs and demands, a true research agenda must be established by the data gaps that exist; data gaps that researchers, if they are good, know exist and seek to fill. A good example of this is the present lack of attention to the data underlying water quality criteria for the priority pollutants. From a regulatory program point of view, most of the water quality criteria have been established. The documents have been produced, published, and are available for public review. From this program's perspective, the Agency need not allocate more resources to research involved in water quality criteria.

The difficulty with that view is that it is wrong. While it is true that the documents have been completed, it is not true that they are adequate. In fact, if one looks beneath the surface of the water quality criteria documents, one finds severe criticism by a broad spectrum of interest groups from the industrial community, academic scientists and the environmental community. The fact is that, through no fault of the Agency, there was simply not enough information on which to base scientifically valid water quality criteria. The best was to compare and contrast a few experiments on a host of chemicals. The majority of water quality criteria are simply inadequate as guidelines for water standards for either health or for aquatic effects. Several of the researchers working on the preparation of them remarked that they had actually developed a terrific research agenda for the development of defensible water quality criteria.

One of the major goals of water quality research at EPA, in my view, should have been to attempt to close the data gaps and close them quickly. The research, involves assisting states and local governments in making site-specific applications of existing water quality criteria. It is ludicrous to assume site-specific applications are possible when there is simply not enough data to have scientifically sound water quality criteria. At least two years have been lost in creating the scientific base on which the Agency's credibility must rest with regard to protecting water quality.

While I was previously committed to the bottoms-up process of budgetary and research planning, in retrospect, it allowed too strong an influence by EPA's program offices. I believe that major budgetary decisions should be made by the researchers with adjustments and corrections made by the program offices.

Now, I would like to turn attention to particular areas within environmental research where leadership by EPA is very important. One of the most important of these areas is that of new pollutant control technology.

The Environmental Protection Agency's FY 1984 budget makes explicit the policy that the government should not be carrying out research on technologies where industry has demonstrated an interest. Since the cost of cleaning up and the cost of control can materially affect the final level of control, the government has equal responsibility and interest to help establish efficient, new control technologies which may be more economical and equitably applied. It is essential that substantial cooperation take place. This is one of the areas where, in my view, EPA has been most successful. A good example of this is the limestone-injected multi-stage burner which represents a major addition to the technologies available for reducing pollutants from combustion. Industry has a complimentary interest in assuring that efficiencies are attained at reasonable cost.

These two objectives are complimentary with respect to the development of new pollutant control technology. LIMB is not unique in this respect. There are other opportunities where fruitful cooperation could take place between EPA and industry. However, they create a need for additional resources and most importantly, additional personnel who could seek out productive opportunities in industrial science and engineering. In the case of control technology now, however, there are few if any new endeavors because of the great reduction in personnel and funding.

In this area of control technology, there is another set of technologies, which are very high on the nation's priority list and which require the Agency's attention. Hazardous waste engineering has had very little effort expended on it by the Agency over the last ten years. In my view, it is in desperate need of additional research. If EPA does not support it, there is little likelihood other agencies will. For example, high temperature incineration of wastes requires good engineering not only for traditional incinerators, but also for other very high temperature destruction methods such as the plasma arc and molten salt. Right now, there are very few hazardous waste sites approved for disposal in the nation. Without a substantial effort by EPA and the regulated industry, it is quite possible that in the future we will simply use existing sites, with interim operating permits converted to permanent permits. A demonstration project would help to accelerate the cleaning up of many obsolete disposal sites.

A second broad area for research leadership in the Agency's research program are the ecological studies. Within the federal government, EPA is the only agency particularly interested in carrying out research on ecological and environmental issues of this kind. Many academic scientists have no support other than EPA. The Agency should be carrying out major and substantial programs in population, stresses upon them and when those impacts become critical. This kind of leadership should have predated, for example, concerns about acid precipitation. The Agency should be carrying out research on soils and the impact of acid precipitation, the interchange between soil systems and aquatic systems. Specifically, work on the toxicity of impacts on aquatic organisms needs to be accelerated. At the moment, the Agency is only reviewing, as I mentioned before, methods for site-specific evaluations rather than direct research on toxic impacts on aquatic systems. If EPA does not have a major program plan to do research in ecological systems and pollutant effects, it is unlikely that any other agency will.

The atmospheric physics and chemistry of pollutant interactions is a subject in which EPA has a fairly clear, unique, and obvious leadership role. The issues of long range transport, far more than simply acid precipitation, ought to be more strongly supported in an Agency research program. In general, the researach program for the Agency on atmospheric pollutants tends to follow a cyclical funding pattern with increases in research just before criteria documents are needed for review by the outside world and than a decline until the next criteria documents are due. This is the wrong strategy. Increased research ought to be undertaken far ahead of the criteria documents so that results are ready for inclusion in each document.

Similarly, the Agency needs not only to review the aquatic effects of pollutants, but it also needs a substantially increased R&D program in the fate, transport, and movement of pollutants through aquatic systems.

Health research is really quite different from other programs in control technology, ecology and the physics and chemistry of pollutant movement and transports. Here, the Agency depends a great deal on the work done by and for other agencies such as the National Institute of Environmental Health Sciences, the National Center for Toxicological Research, the National Toxicological Program, etc. Each of these, however, has a specific set of goals and their programs are not designed to address questions related to EPA's regulatory agenda. Even within that constraint, however, there are opportunities to affect the direction of much of the research that occurs within the rest of the government. EPA for some years provided funds to the National Center for Toxicological Research at Pine Bluff, Arkansas. While those funds were used for research of less direct relevance to Agency programs, the existence of the funds allowed EPA to influence the direction of much of the center's research. I would not argue that this research should be substituted for the remaining health research efforts, but it is highly useful to maintain Agency input to a broad array of other research. In the area of health research, there are some key areas. The development of methods to assess health effects is critical. Since the Agency is so involved in questions of whether or not a particular chemical is hazardous to public health, methods that are quicker and less expensive to use obviously have a great value in quickly determining whether or not one should regulate a chemical, either in its production or in its discharge to the environment. This area is important for all health studies (cancer causing agents, mutagenic agents, reproductive, and neurological). Air inhalation toxicology is a subject that the Agency has addressed—it too should be strengthened and expanded. Though somewhat underutilized, the clinical facility in North Carolina is very good. Their program to relate animal and human inhalation toxicology should also be extended and expanded. Without such studies, the setting of health related standards is too much guess work.

The Agency presently has a very substantial and well respected leadership position in nonionizing radiation health effects research. While at the moment these efforts are not a high priority, it is an area in which the Agency's research budget in the past constituted nearly 25 percent of all research in the nation. I think you will find, Mr. Chairman, that the program continues to be highly respected. The program is now under threat of being abandoned. This is due in part, because it does not appear that nonionizing radiation poses an immediate health threat. The growth of the electronics and the communication's industries related to nonionizing radiation, microwaves, etc., however, is continuing to grow at a rapid pace. While it appears that the general level of microwave radiation, at present, is far below densities where health effects may be of concern, it is only through the support and encouragement of this kind of research that we assure ourselves in the future that public health will not be at risk.

The Research and Development Program ought to be a leader in the area of monitoring pollutants throughout the environment. Of first concern, is quality assurance. If one does not know the quality of the data, one doesn't know its significance. EPA's quality assurance program presently underway in ORD, is improving. It should be fortified with resources to maintain its usefulness to all of EPA's programs.

The fundamental problem of monitoring pollutants is the lack of meaningful, significant data for many substances. This is true in old networks and in new ones. The old networks represented by the standard water quality network and the standard air quality network, that deal with what one might call conventional pollutants, have a very difficult time working with states and local governments. The quality assurance program's problems are legion. I understand that this committee may be addressing some of these issues in the near future. The old networks are dispersed among all the program offices of the Agency—that provides problems too. For new networks measuring toxics, the Agency hasn't really begun to produce a system that is widely available.

There is one exception. Recently, largely at the prompting of the Office of Management and Budget, the Office of Research and Development has established, and now operates an inhalable particulate network. This network separately measures fine and course particulates and eleven metals present in air. This is the first of the new networks to measure potentially hazardous air pollutants. I have had the opportunity to review some of the data collected through this network. They appear to be accurate. The Agency's quality control in managing and operating the network is excellent. Definite quality control standards have been applied in obtaining early results. While data gaps still exist as the network is still being developed, these efforts are representative of the kind of networks that need to be established in the future. The Agency should enhance its leadership position by setting up new networks for measuring atmospheric Volatile Organic Compounds and priority pollutants in water in a consistent and coherent way, perhaps in cooperation with industry. This, of course, cannot be undertaken without encouragement, without resources, and without personnel.

Over the last decade, we have been constantly hit with crisis after crisis over where we have substantially impacted various ecological systems. The recent acid rain debate is typical. We desperately need a broad baseline of data on which to evaluate whether effects are taking place so that, a decade from now, we would be able to see trends in ecological health and environmental values to determine whether or not we are cleaning up and protecting the environment. Such a baseline network has not been established and it is not likely to be established unless major responsibility is delegated to the Agency.

In summary, Mr. Chairman, I believe the key leadership areas for EPA's R&D lie in developing new control technology, greater understanding of ecological systems, pollutant transport and fate and work on the aquatic effects of pollutants. Specific programs in health research, such as air inhalation toxicology and methodological developments need support, The development of monitoring systems to establish new indices of the nation's environmental health will continue to be important. Without good data, Agency policy makers cannot make rational and defensible decisions. To assure that needed information is available, EPA's research program must exercise a role of leadership in many of these key areas. Such leadership requires talented, expert Agency managers and scientists with the know how to implement R&D programs as well as sufficient dollar resources for their mission. In my view, both of these requirements, people and money, require substantial, not marginal, increases in the EPA budget in the areas that I have discussed. I urge you to consider the budget that EPA had two years ago, close to $200 million for R&D and over $100 million for salaries and expenses as a goal for this year.

Mr. SCHEUER. Thank you very much, Dr. Dowd.

Now, Dr. Davies. You take your 7 or 8 minutes, try to stick to that, and then we will have some questions for you.

STATEMENT OF DR. J. CLARENCE DAVIES, EXECUTIVE VICE PRESIDENT, THE CONSERVATION FOUNDATION

Dr. DAVIES. Since I concur with most of the basic points made by Dr. Dowd, let me save the committee some time by just dealing with two points.

One is what, to me at least, is the underlying rationale of the EPA budget, which is that the main function of research should be simply as a support mechanism to meet the immediate needs of the regulatory program. Dr. Dowd addressed that in his testimony.

I address it in my testimony also, but come at it in a somewhat different way, and I think, since it is such a critical point, since it is going to pertain to the years to come as well as to this year, and since it colors all of the budget, it is worth taking some time to consider. To me, that rationale for putting the EPA research budget together, to put it together simply as a sort of support mechanism to the regulatory programs, is a fundamental mistake.

To me, the best way of seeing what a mistake it is is to look back 10 or 12 years and see how we defined the environmental problem then.

Until the mid-1970's, we thought that we had to deal with only four or five major air pollutants and a handful of water pollutants. The recognition of the hazards posed by toxic substances has made us realize that we must cope with hundreds, perhaps even thousands, and we are still groping for feasible methods of determining the health effects of these pollutants, for monitoring their presence in the environment, and for technologies to control them.

Until the past few years, we thought that the geographical scope of the pollution problem was limited to a mile or two around the pollution source. We now realize that air pollutants may travel hundreds of miles, and we do not have the scientific information needed to cope with this realization. We do not have the regulatory framework to deal with it, either.

Until recently, we thought that the effects of pollutants were limited primarily to acutely toxic effects on humans and wildlife. We now realize that the chronic health effects probably are more important than the acute effects. Even more jarring to our sense of the time dimension of environmental problems, we now realize that effects that may take decades or even centuries to be perceived, such as acid rain or global climate change, may have a major adverse impact on human health and welfare.

We are still suffering from the belief that pollution problems can be dealt with in neat compartments defined by the medium in which they occur, although we are gradually coming to realize that much of our pollution control effect results only in shifting pollutants from one medium to another.

In short, all of the boundaries of time, space, number of pollutants, type of effect, and media that defined environmental problems 10 years ago are no longer valid today. If we had constructed a research program 10 years ago based on the problems of that time, we would have been very much off on the wrong track. I think the same can be said for today.

I think that the changes in the definition of environmental problems lead to a set of research tasks which the Agency must do, and let me briefly just describe some of those tasks. Dick has described some of them, also, but let me try to supplement his list briefly.

It seems to me that one of the things that the Agency needs to give much greater emphasis to is studies that cut across the different media of pollution—air, water, solid waste, and so forth. A great deal of what we do now in the way of pollution control is really just sort of a big shell game of shifting pollutants from one medium to another. Unless we begin to think through both the regulatory mechanisms and begin to gain the scientific understanding as to how to stop playing that game, we are going to keep constantly falling behind.

This means things like materials balance analysis for pollutants, especially for the toxic pollutants, and much more scientific examination of air deposition in water. Acid rain, I think, is simply a prototype forerunner of the kind of problem that we are going to be facing increasingly in the future. Sixty percent of some of the toxics in the Great Lakes come via air deposition; they get into the Great Lakes from air. That fact is not recognized by our scientific research programs, and it is certainly not recognized by our regulatory programs.

Then we have to look into long-range air transport, its chemistry and its modeling, and again not just for acid rain but for a whole range of phenomena.

So I think that is one set of things which the Agency needs to give considerable emphasis to, and which it is not giving emphasis to now.

Nonpoint sources is another area, both in air and in water, certainly in water. Nonpoint source pollution is a major problem. In many areas, it is a much greater problem now than point source pollution from industries or from municipal treatment plants. And yet the Agency is doing little or no research on the subject. The Clean Water Act does not adequately deal with nonpoint source pollution, and the whole area needs a great deal of work.

Dr. Dowd mentioned the questions of hazardous wastes. One of the problems there that I would highlight, is trying to get hold of the degree of risk coming from mixtures. What we have in hazardous waste dumps is a very complex mixture of all kinds of things, and we really do not have a very good handle on how you measure the hazard, much less how you control the hazard, from those kinds of complex mixtures.

We also need to do a lot in terms of disposal technology. I think, again, there has been an almost total revolution in how we think about the hazardous wastes problem over the last 2 years. Two years ago, you would not have found too many people who said that land disposal was simply not the way to go in terms of disposing of hazardous wastes. I think, today, you would have trouble finding people who said that that was the way to go.

Clearly, that fundamental change in viewpoint requires a lot of research to be done about disposal technologies.

Let me mention quickly risk assessment, where we need a lot of work done on things other than cancer and some work on cancer. Also, in terms of risk assessment, we need new institutions to deal with risk assessment. That is not directly related to the R&D budget, but I bring that point up because it is directly within the purview of this committee, and I would hope that the committee would at some point turn its attention to the question of institutional mechanisms for risk assessment.

Dr. Dowd emphasized monitoring techniques. I would strongly second that, and particularly monitoring techniques for toxics, which are almost nonexistent at this point.

And then, finally, the question of indoor air pollution which, first of all, is potentially a major problem, but which is interesting, also, because it is an area where EPA had a small but, I think, quite effective and important research program ongoing, and that program has now been totally discontinued.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Davies follows:]

TESTIMONY OF
DR. J. CLARENCE DAVIES
EXECUTIVE VICE PRESIDENT
THE CONSERVATION FOUNDATION
BEFORE THE
SUBCOMMITTEE ON NATURAL RESOURCES,
AGRICULTURE RESEARCH AND ENVIRONMENT
COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

APRIL 27, 1983

My name is J. Clarence Davies. I am Executive Vice President of The Conservation Foundation, an environmental research and communications organization located in Washington, D.C. The Foundation has been conducting research on environmental policy questions for the past 35 years. I personally have been actively involved in environmental policy for the past 18 years, served six years as a member of the Executive Committee of the EPA Science Advisory Board, and was the first chairman of the EPA Administrator's Toxic Substances Advisory Committee.

I wish briefly to make three points to the committee about the 1984 EPA budget for research and development.

First, the 1984 R&D budget request overall represents a further deterioration of EPA's ability to perform its mission. In an agency that has already been grievously weakened, a further 10% cut (15% in real purchasing power), coming on top of the major reductions of the past two years, reinforces the general direction of major institutional damage to the agency.

Institutional damage, or destruction, is one of the hallmarks of the FY 1984 EPA R&D budget. No money is provided for the National Center for Toxicological Research, thus endangering the future existence of the major government institution doing research on toxicological testing. Also, funding has been reduced for the Health Effects Institute, thus impeding a pioneering venture jointly funded by EPA and the automobile industry.

EPA has stated to this subcommittee that, "We (EPA) have learned that carcinogenic chemicals are present in diesel exhaust, and therefore we have recognized diesel exhaust as potentially carcinogenic for humans, albeit weakly." Apparently the response to this finding is to weaken the Health Effects Institute, the outside institution primarily responsible for studying the health effects of diesel exhausts, and at same time to eliminate entirely in-house efforts on diesel health effects.

My second basic point, and perhaps the most important, is that the need to understand and identify new problems and to conduct basic and exploratory research is more pressing than ever before.

There is a widespread view, apparently reflected in the proposed budget, that we know all the environmental problems that exist and that the only need is to deal with a well recognized and well defined set of environmental threats. My own view is that we are in the early stages of a total reorientation of what we perceive to be the most important environmental problems, and that we are in desperate need of more research to help define the environmental problems of the future.

Until the mid 1970's we thought that we had to deal with only 4 or 5 major air pollutants and a handful of water pollutants. The recognition of the hazards posed by toxic substances has made us realize that we must cope with hundreds of pollutants, and we are still groping for feasible methods for determining the health effects of these pollutants, for monitoring their presence in the environment, and for technologies to control them. Until the past few years we thought that the geographical scope of the pollution problem was limited to a mile or two around a pollution source. We now realize that air pollutants may travel hundreds of miles, and we do not have the scientific information needed to cope with this realization. Until recently we thought that the effects of pollutants were limited primarily to acutely toxic effects on humans and wildlife. We now realize that chronic health effects probably are more important than acute effects and, even more jarring to our sense of the time dimension of environmental problems, that effects that may take decades or even centuries to be perceived, such as acid rain or global climate change, may have a major adverse impact on human health and welfare. We are still suffering from the belief that pollution problems can be dealt with in neat compartments defined by the medium in which they occur, although we are gradually coming to realize that much of our pollution control effort results only in shifting pollutants from one medium to another. In short, all of the boundaries of time, space, number of pollutants, type of effect, and media that defined environmental problems ten years ago are no longer valid.

The traditional boundaries are no longer valid, but we are just beginning the process of establishing new ones. Given this context, it is not the time to cut EPA's ties to the universities by transferring the exploratory grant program to NSF. It is not the time to sharply cut basic research in the agency. It is, above all, not the time to "reorient" the EPA research program so that it serves simply as an adjunct to the regulatory functions of the agency.

This brings me to the third point which is the importance of the research function in EPA. The research function is important in two ways. First, research is necessary for the regulatory responsibilities of the agency. Second, some important types of research are done only by EPA, and other agencies and the scientific community depend on EPA to fund these research areas.

A large portion of the EPA research is necessary for the formulation and implementation of the agency's regulatory program. Assessment of the health and environmental effects of pollutants, development of control technologies for air pollution control and hazardous waste disposal, and assurance of adequate monitoring data are among the regulation-related functions which the agency must carry-out if regulation is to be on a sound footing. These functions cannot be done by other agencies. As the early experience with EPA and the National Institute of Environmental Health Sciences demonstrated, and as the relationship between OSHA and NIOSH is still demonstrating, regulation-related research cannot be successfully separated from the regulatory agency. EPA has enough difficulty relating ORD to the regulatory programs _within_ the agency. To think that research on pollution control technology will be taken-over by the private sector is patently unrealistic. There is very little incentive for the private sector to do much of this research, especially given the disinclination of the Reagan Administration to adopt technology-forcing regulations.

EPA is not just a regulatory agency. It has important non-regulatory missions as well, and among the most important of these is ecological research. No other agency has the responsibility to monitor the basic health of the environment, to ascertain baseline ecological conditions, or to develop models for predicting the transport of pollutants in the environment. Unless EPA performs this research it will not be done. If the research is not done we may well find that we are spending large amounts of money trying to control the wrong pollutants in the wrong places while at the same time we are doing nothing to deal with potentially serious threats to the environment.

Adequate information, derived from both research and monitoring, is a necessary precondition for intelligent policy. A few parts of the FY 1984 R&D budget, such as support for quality assurance of monitoring data, reflect a recognition of this fact. But for the most part the proposed budget reflects an ostrich-like view toward environmental problems and a less-is-more philosophy toward the needs of EPA in carrying-out its mission. Less-is-more may be an appropriate slogan for the Orwellian year 1984, but it is a prescription for environmental disaster.

As The Conservation Foundation stated, commenting on the 1982 and 1983 budget cuts, "Because of the budget cuts, the information base for environmental policy, always weak, is likely to be even weaker in the future. We will be less able to sort out important problems from unimportant ones, less able to tell which environmental programs are working effectively and which are not. Perhaps most important, the perennial dilemma of whether available information is sufficient to justify action will become more pervasive and difficult.

"Not to take action is itself a decision. To decide to wait for more information is, in fact, a decision not to take action. But the less adequate the available information, the more the decision to take or not take action will be based, even more than in the past, on ideology or the instincts or self-interest of decision makers." In recent months we have seen some of the tragic consequences of this type of decision making.

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Mr. SCHEUER. Claudine?

Mrs. SCHNEIDER. Dr. Davies, you made the point that, insofar as dealing with our pollutants, we are actually doing a shell game of shifting from air to water and vice versa, and to land, et cetera, and having particular difficulty with nonpoint sources.

To what degree do you see the problem there being one of enforcement, or is it more of a problem of monitoring?

Dr. DAVIES. I think both enforcement and monitoring are problems, so that I do not mean to minimize the importance of either one.

Mrs. SCHNEIDER. Right.

Dr. DAVIES. However, I think the problem transcends both of those areas, really. It certainly transcends enforcement, because I think the problems exist with the basic statutory structure, at least as it is now interpreted.

No matter how much enforcement there was of the Clean Air Act or the Clean Water Act, you would still have the same kind of shell-game problem. You might even have it worse in some instances, because, for example, if all of your pollutants were taken out of water effluents and put in sludge, which was then disposed on the ground, got into the ground water, or some of it volatilized and got into the air, the problem would be worse, not better.

So I don't think it is an enforcement problem. I think it is a problem of trying to think through a regulatory structure that connects the different statutory authorities, gives you a framework for deciding what you really want to do in the end, what sink you want the pollutants to go to finally, and then enforcing according to that final decision.

Mrs. SCHNEIDER. Well, let me say that I found the testimony by both of you to be so very thorough that there are hardly any questions to be asked, to be very honest. I was just talking to the staff person, and she said that when she had read the testimony in advance, she reached the same conclusion.

I cannot imagine who—and I look forward to the testimony of the other witnesses, but I cannot imagine who in this group and among my colleagues could possibly differ with some of the points that you are raising.

So maybe, if we are, let me assume, in agreement on some of the general direction that you recommend, perhaps each of you could specify what areas ought to be considered priority areas when we are talking about increasing the spending.

I know that each of you mentioned a broad number of things, everything from putting in some adequate funding for indoor air and hazardous waste and a broad spectrum of other things. But if were to list them, one, two, three, four, what would be at the very top of the list?

Dr. DOWD. I think the first thing I would do is to make a philosophical difference, and I would say that it is time that the Agency's research program again get into the business of problem definition and exploratory work. In my view, that would be the single most important issue.

When one no longer has the intellectual ability to think broadly, in fact one stops thinking broadly, and I believe that as the Agency's research program has become more of an order taken than of a generator of ideas for research, you can see the result.

Now, that doesn't mean that there should not be substantive areas within that, but that would be the first thing I would say: Again, get back to the issue of a fixed and significant fraction of the research money assigned to rather broad exploratory research.

Mrs. SCHNEIDER. All right.

But, nonetheless, I still am anxious to know where you might—we have to mark up this budget next Tuesday, I am told, and at that time, I would like to be sure that I, for one, am suggesting we put money into the health effects or into the toxic substances or monitoring systems or drinking water or whatever it might be.

Dr. DOWD. Terry, why don't you try that one, and while you are talking, I will think hard, too. [Laughter.]

Dr. DAVIES. It is very difficult to make those kinds of choices because it obviously depends, first of all, on a fairly detailed knowledge of what is in the budget, more detail than an outsider would be likely to get.

I would certainly put the hazardous waste problem and all of its ramifications at the top of the list, I think, both in terms of where we are going with regard to reuse and disposal, how do we determine how much of a danger it is, and, connected with that, monitoring techniques for both mixtures and for toxics in general. I think that would probably be my No. 1 priority.

Mrs. SCHNEIDER. All right.

I think that one of the largest frustrations that I face in dealing with hazardous waste is that I find that many chemical manufacturers and other types of manufacturers that use chemicals in their processes are extremely frustrated in that they know there is technology out there that would allow them to recycle or reuse some of the chemicals, but yet they cannot identify, they cannot find out more information about the technology.

Do you feel that this might be a role that the Environmental Protection Agency should assume—that of being a clearinghouse for technology on hazardous waste and how manufacturers may deal with it, or municipalities, for that matter?

Dr. DOWD. I think that the whole role of the Agency's research program vis-a-vis industry really needs to be rethought. It is clear that there needs to be a fairly strong level of cooperation, which I think has been there in the past sometimes with the Agency's control technology program, but at the moment, there is the general sense that if it comes within the rubric of industrial application, the Agency should take more of a hands-off attitude toward it.

It seems to me that, in the past, there was a rather small and not-as-good-as-it-ought-to-be clearinghouse activity that went on. I agree that ought to take place. But it seems to me, also, that in the broad area of hazardous waste technology, the Agency could serve as a catalyst for finding control technologies that are available and have been used, not so much from the standpoint of requiring regulation as from the standpoint of finding things that are acceptable to the public at large.

One does not have to be a genius or a researcher himself to read the newspapers and see that there are very few citizens in the country, in any location, who want to have a hazardous waste site next to their house.

I think, unless we really work very hard to come up with some good technologies, we are going to find this continuing throughout the decade, and we are going to be really stuck.

I think your suggestion of a clearinghouse is at least a modest step in that direction, but I would say a more aggressive program of engineering on the part of the Agency, in consultation and with real cooperative research programs with industry, is appropriate.

Mrs. SCHNEIDER. Well, we have had some terrific testimony before this committee on previous occasions, quite clearly stating that the witnesses believed that the technology is here and now; it is just that the public awareness of that technology existing is practically nil.

So we do have a real void insofar as information is concerned.

Dr. Dowd, you also mentioned in your testimony about human exposure to indoor air, and you cited it as an example where research is needed because there is some evidence or suspicion that it could be causing significant human health problems.

I wonder if you could elaborate a little bit on that and give us, for the record, any evidence that you might have that would support your recommendation.

Dr. DOWD. I have observed in a study that I have carried out that is not released yet an attempt to look at some toxic materials but with respect to indoor and outdoor levels.

One of the problems one faces is that there is very, very little data on air pollutants that do not fit the conventional pollutant list. There just simply is not very much information available. But it is clear from researchers that have carried out some tests of indoor versus outdoor air that if one asks the question, what is the risk to the person, it may very well be, much in the way as nonpoint sources in water may be more important to certain water stretches than single point sources, that a person's total set of activities, including indoor activities, may be more important to the risk that they have from air inhalation than just simply knowing what the ambient air levels of a given toxin are.

I think, that being the case, it is incumbent on the Agency, as the only area that has the expertise to do measurements like this, to have a significant program in indoor air pollution.

Mrs. SCHNEIDER. What kind of specific research would you suggest that the Agency undertake in this area?

I am supposed to ask hard questions, Mr. Dowd.

Dr. DOWD. Well, that is a hard one, because, unfortunately, at present, I am not a direct worker in that area, and it would be hard for me to spell out some protocols, except for my observation that it is likely to be a serious and perhaps the most significant part of an individual's exposure that may come from the contribution indoors.

Dr. DAVIES. A lot of the previous work was related to measuring levels of various pollutants in, let us say, household or office settings, and then ascertaining what the sources of those pollutants were. That work had really just begun, and so it seems to me that should be the initial goal of the research.

Mrs. SCHNEIDER. Very fine.

My final question is one that, hopefully, you will be able to respond to as residents of the general vicinity of the Chesapeake Bay. It relates to water quality and the lack of monitoring that has been done around the country and the way the budget has been reduced for water quality.

There is some discussion now, and growing evidence, that the Chesapeake Bay, in particular, is producing an enormous amount of either very sickly blue crabs or a diminution of blue crabs in general and other kinds of shellfish and other fish. Do either of you have any either scientific or professional knowledge about this or just general hearsay from your local fish market?

Dr. Dowd. No. I would just, if I can, tell an apocryphal story that relates to that.

If you remember the kepone incident on the James River, when that incident occurred, or—let me restate—when, finally, the source of the kepone contamination had been identified and it had been stopped, and people's health, at least some, had been very severely impacted; when one looked back at the catch records for the blue crabs in the James River, it was noticed that for a period of about 3 years prior, the number of blue crabs in the James had gone down from their historic levels to about 10 percent of that, at about 3 years before the incident occurred or at least became public.

Subsequently, at EPA's Gulf Breeze Laboratory, they were doing studies on various crustaceans including the blue crab, and it turned out that, at the levels one was seeing for kepone, there was a reduction, an increase in mortality, of nearly 90 percent on a routine fashion.

I am very much of the opinion that it is exactly that kind of observation of the natural system that uses what we in our whole life put in the environment that can become very important indicators for important parts of environmental contamination.

I do not know what would be likely to be the cause of a blue crab decline in the Chesapeake Bay. It could by anything from fertilizer to gasoline from motorboats.

Mrs. Schneider. But the point is that probably the Environmental Protection Agency also does not know.

Dr. Dowd. That is right.

Mrs. Schneider. Do you think that is an appropriate assumption? When we have the EPA testify, rather than work on assumptions, I will be sure to ask them. But given the reductions in the budget and knowing what you know about the level of water quality monitoring that has been going on, I think that we can assume that EPA is not even aware of it because of the lack of monitoring.

Dr. Davies, did you wish to comment on that?

Dr. Davies. No. I would agree with your last observation, unfortunately.

Mrs. Schneider. All right.

Those are all the questions I have, Mr. Chairman.

I thank the witnesses for some very thorough testimony. Thank you.

Mr. Scheuer. Congressman Brown of California?

Mr. BROWN. Did I understand that both of you gentlemen agree that research in the area of hazardous waste should have an extremely high priority in any EPA research program?

Dr. DAVIES. Yes, sir. I concur with that.

Mr. BROWN. Last Friday, I participated in a hearing out in California with regard to a specific toxic waste site but with a focus on the general research needs, and I would like to cite a couple of the items of testimony there and ask your reaction to it.

For one thing, it was indicated that the cost of cleaning up the hazardous waste dumps around the country was probably going to run 10 to 100 times what it would have cost to have properly disposed of the waste to begin with; that is, to render it harmless in some fashion. Would you have any basis for concurring or differing with that testimony, either one of you?

Dr. DAVIES. I guess I have heard that kind of range, and it strikes me as plausible. There are clearly a lot of assumptions built into it, and it is clearly a sort of rough-cut estimate.

The one thing that I think can be said with absolute certainty is that the costs of cleanup are certainly considerably higher than the costs of doing it right in the first place. Whether it is 10 times or 50 times or 100 times or more than 100, I don't think anybody really knows for sure.

Mr. BROWN. In this particular dump, the Justice Department has just brought suit against the persons or the companies that were responsible for the wastes in the amount of—the figures that I have seen are $20 million to $40 million, which is several times over what the companies paid to put the wastes there to begin with.

The conclusion from the testimony on this one site was that if there are similar costs for the other several thousand hazardous waste dumps around the country, the amount of money in the Superfund was going to be, again by an order of magnitude, too small to take care of it. Does this conform to what knowledge you may have? I am not asking you to pose as experts on it, but is it somewhere close to—in other words, is the cost of cleaning up the toxic waste dumps in this country going to be covered by the revenue produced by the Superfund over the next 3 or 4 years, as far as you can tell?

Dr. DOWD. I guess, to a certain extent, it depends on what you think the Superfund is going to cover, since it, to a certain extent, in any event, only covers those sites that are not handled by, quote, responsible parties, unquote.

I guess probably, if one established a certain level of what clean means for a site, it is not unrealistic to say that the total budget for Superfund probably would not be sufficient to cover the total costs, including private as well as public, that would probably have to be spent on all of the sites that are likely to be identified. I think that is probably true. How much greater they would be, I certainly am in no position to say.

Dr. DAVIES. Let me just make one additional point on that, and that is the same point that was made in a recent study by the Office of Technology Assessment, which is that I think we have to be careful not to have a self-perpetuating hazardous waste problem as well as a self-perpetuating Superfund, by taking the cleanedup wastes and putting them in inadequate landfills, also.

Mr. Brown. Well, I concur with that.

We had testimony that indicated that there were technologies available for disposing of almost any kind of toxic waste, but that they had not been integrated into programs for doing that. There has been no incentive.

The State of California is trying to provide that incentive by making landfill disposal much more expensive, which is one way to give an economic incentive to other ways of disposing of the waste.

I am really fumbling for a way to get a handle on what is a proper amount that could conceivably be devoted to research in this area. If we are talking about a problem that is several billion dollars, we will say—somewhere between $2 billion and $10 billion as a minimum—and we need to think in terms of developing new ways of disposing of it, we ought to be able to relate this to a research budget in some fashion or other.

This particular site in California, which has received a lot of publicity, is almost a classic example of everything that can go wrong. It was designed originally with the idea that it had an impervious base; it turns out to have a fractured base. It was thought to be insulated from the water table; the waste is now approaching the water table. It was thought to be safe if you put a cap over it; it turns out there are underground springs percolating into it and washing into the water table.

The question that I ask myself is, is it possible to define or to characterize a demonstration project for the disposal of wastes in situ that could be of benefit to the entire country in terms of disposing of similar problems around the country? This had never occurred to me before, but the cost of removing all that waste, which is the only way to make the site safe, if you cannot actually transform it to something safe in situ, runs to maybe $100 million in transporting it to another site and putting it there, which merely moves the problem to another area.

To your knowledge, has thought been given to a demonstration of an in situ process for rendering safe a toxic waste dump? It would have a lot of complications that just disposing of the individual elements that were dumped there does not have, because you have synergistic effects and many other things.

Dr. Davies. I have had occasional discussions on at least the general question of the need to demonstrate technologies for cleaning up hazardous waste sites. Whether they could be in situ processes or not I think is an open question. I don't know enough to answer that. I think the idea is an intriguing one.

But we really do not have any sort of state-of-the-art kinds of demonstrations now of any kind of method of cleaning up hazardous waste sites, and I think we need them, and I think those kinds of demonstrations could be highly useful.

We have to be careful because each site is unique to some degree, so there is always the question of, if you demonstrated in site A, how much relevance does that have for sites B, C, and D? But we do need that kind of demonstration, and it would be nice to be able to develop the kind of process you are talking about.

Mr. **Brown**. Well, I imagine that this is fairly typical: Something like 50 million gallons of gunk poured on 20-odd acres, thoroughly mixed over 25 years. It certainly is a process which would challenge the imagination of almost anyone. But this is more or less of these sites. It is typical of Love Canal or almost anything that you can think of, offhand. Right now, we just fence them off and hope that nothing ever happens.

Thank you, Mr. Chairman.

Mr. **Scheuer**. Well, this has been an excellent panel, and you have had excellent questions from my two colleagues.

We do have some additional questions. In respect of the time, we will submit them to you in writing and hope that you can get us answers in writing. We will hold the record open for a week or 10 days for that purpose.

I am just going to ask you one more question, both of you, and I am going to ask the same question of the subsequent panelists.

Considering what you have said and the questions you have heard, there is obviously something wrong with the way our institutions of government are addressing the problems of toxic wastes. We are not only perpetuating them at the same level that they are at now; we are increasing them. We are creating more toxic wastes every day and every week than we are cleaning up. The problem is getting out of hand; it is out of control.

Here we have the bizarre picture of Dow Chemical spewing dioxin in the Tittabawassee River, and they won't tell EPA what they are doing, and they won't let EPA examine the discharge. Is there something wrong with our laws? Is there something wrong with the standards of proof that we need, the linearity, the 100 percent cause-and-effect relationship that we require before we can take action? Is there something wrong with a society that says, in a very murky scientific area, that society has to know everything before it can do anything? Is that part of the problem? Is part of the problem lack of corporate statesmanship?

How do we produce CEO's, chief executive officers, who will find the conscience to forego an opportunity of taking advantage of every last jot and tittle of the law?

They cannot understand how we can fulfill our mission so incompetently. Frankly, I cannot, either.

Taking us up to the mountaintop for a moment, what do you think we ought to be doing here in Congress? Is there some tinkering that we can do that will help, is there some basic restructuring, basic new standards? Help us out of this quagmire that we seem to be stuck in.

Dr. **Davies**. Well, you said earlier, sir, that you wanted simple answers, and I am afraid that that may not be possible because it is a very complicated set of circumstances and situations.

I guess I would say two things. One is that the scientific base clearly needs improving. I think that is closely related to the kind of problem that you are talking about. For example, one of the difficulties we have here is referring to hazardous waste as if it were one homogeneous thing, and it is clearly not; some of it is very hazardous and some of it is not very hazardous at all.

We need to be able to distinguish degrees of hazard, learn how to detect them, how to identify them, and so on, and transmit that information to the public, because a lot of the fear—some of the fear—is well founded, but some of it is not. I think the American public is intelligent enough to be able to make those distinctions if we have enough knowledge to be able to tell them how to do that.

Secondly related to that, it seems to me one of the problems that we have in the system as a whole—but hazardous waste exemplifies it quite well, I think—is that we have tended, especially in the environmental area, to have a sort of adversary kind of system where people tend toward the extremes rather than toward the middle, and they tend to shout rather than talk to each other. A lot of the mechanisms that we have set up for dealing with these problems encourage that kind of tendency.

It seems to me it is about time we started working in the other direction and paying more attention to things like mediation and dialog and a format for public hearings which is structured so that people really talk to each other rather than at each other. I think that kind of change in our institutions could make a big difference.

Mr. **Scheuer**. Let me just add another subset. I couldn't agree with you more. How do we get industry to help us do this job? How do we get that terrifically brilliant and creative cadre of scientists at Dow Chemical, instead of hiding from us and continuing to do their thing in their own very brilliant way, how do we get them to help us to educe that will enable society to set reasonable standards, reasonable parameters of what Dow can do and not do, that will enable Dow to go its very successful way in producing more and better chemicals for the benefit of consumers all over the globe? We don't want to stop Dow and the other members of the chemical industry from being productive and creative. We simply want them to do their thing and to carry on their corporate activities in ways that are consistent with human health and environment.

We are not even seeking a risk-free world, but we ought to try to keep risks to reasonably minimal levels. How do we get their help in doing that? There is an awful lot of talent out there in the private sector. How do we get all of that scientific talent to be part of the solution rather than exclusively part of the problem?

Mr. **Davies**. I think it is a matter of structuring incentives to a great extent. It seems to me that, on the one hand, that means we need an enforcement program that is credible; we need laws that in some respects, at least, are stronger.

I testified last week before Mr. Florio on the Toxic Substances Act and was pleading for the chemical industry to submit adequate data because, at least in my reading, the data are not adequate on new chemicals, which is sort of the beginning of the kinds of problems you are talking about.

So I think there are a lot of areas where we need stronger laws, a tougher hand, if you want. However, I think there has got to be a sort of "carrot" element as well.

We in the Conservation Foundation have conducted, over the last 7 years, a number of dialog group efforts, many of them involving the chemical industry, a number of them involving Dow Chemical specifically. Dealing with these problems across the table, not in the limelight and not trying to make points or score points for the sake of doing that, I think both industry and environmentalists and the various other segments of society can really make some progress and can talk to each other in a reasonable fashion and can utilize the kinds of talents that you are talking about.

Mrs. **Schneider**. Would the chairman yield?

Mr. **Scheuer**. Of course.

Mrs. **Schneider**. I feel very strongly that Mr. Davies has put forward an excellent case for us to look at the administration's proposals for the budget here for the EPA R&D because, essentially, his bottom line is the way that we answer your question. The way we get industry to cooperate, and the way to stop polluters is to provide enough scientific research and development data to prove that there is damage that is occurring, either in human health or the environment.

And so I think that we do have a very good case from your testimony for good reasons to increase the budget in those areas.

I would just like to say that I think it is inaccurate to categorize all chemical manufacturers or producers as being the bad guys. I do see a willingness now, with information, as more knowledge develops, as more scientific proof is generated, for those industries to wake up and say, "My gosh, before we did not think it was causing a problem to dump our waste into the bay or into the river."

Looking on a microcosm on my own State of Rhode Island, which has an enormous number of hazardous waste sites, which has an enormous number of pollution problems, the chemical manufacturers in our State and other manufacturers who use or produce toxicants are not at all interested in continuing to pollute. Now they have the knowledge; now they have the research data; they are no longer acting out of ignorance.

I believe that we need to give those folk the benefit of the doubt that they are, more often than not, trying to act in good will. Part of the reason is that they fall into that backyard syndrome. The guy who runs American Hoechst lives right down the end of the bay. The people who work at Ciba-Geigy want to protect their communities and their environment and their families.

So I do think that we need to give the benefit of the doubt, but ignorance can no longer be a claim, but it will be possible to use lack of knowledge unless we maintain a sufficient budget for the Environmental Protection Agency's research and development budget to continue along the ways that it was intended.

I think you gentlemen have given us a very good case. Just in closing, I would like to make sure that you are aware that your testimony did not fall on deaf ears insofar as indoor air pollution is concerned. Despite my senior members and much-respected Democratic colleagues, who are major contributors to indoor air pollution [laughter], yours truly is going to be working on the indoor air pollution problem. Hopefully, I will have the cooperation of my colleagues.

Thank you, Mr. Chairman.

Mr. **Scheuer**. We will ignore that gross breach of congressional courtesy. [Laughter.]

I thank the panel for its really splendid testimony. We couldn't be more appreciative. Thank you very much.

Before the second panel, we are going to hear from a very distinguished colleague, the Honorable Cooper Evans of Iowa, Member of Congress, who has some testimony to give us.

We are happy to have you, Congressman. Please feel free to use such time as you may need.

STATEMENT OF HON. COOPER EVANS, A MEMBER OF CONGRESS FROM THE STATE OF IOWA

Mr. EVANS. Thank you, Mr. Chairman and members of the committee.

Mr. SCHEUER. Your testimony will be printed in full at the conclusion of your oral presentation.

Mr. EVANS. Thank you very much. I understand that, and I will try to keep my remarks relatively brief.

I do deeply appreciate the opportunity to appear before you today to offer testimony during your consideration of these R&D programs for the Environmental Protection Agency.

Mr. Chairman, as you and members of the committee may remember, in October of last year, during the floor consideration of the EPA R&D bill, I offered an amendment—with the support of both you, Mr. Chairman, and the distinguished ranking minority member—which authorized the Administrator of the EPA to implement a program called the senior environmental assistance program.

I was successful during that floor consideration, and the amendment was adopted. But, unfortunately, the President saw fit to veto the bill. And so I am here today to ask again for your support in my effort to provide for an authorization for the senior environmental assistance program.

Currently, this program, which is based on a highly successful demonstration project, is being carried out but on an ad hoc basis. I believe that this program provides too great a service to our older Americans and to efforts to improve the environment to be allowed to continue on such an informal arrangement.

As just one example of the type of work that this program has accomplished in the pilot phase, I would like to tell the committee about one of the pilot programs which was carried out in my State of Iowa.

The Iowa Department of Agriculture utilized nearly 100 senior workers to perform a statewide pesticide inventory program. The demonstration was then expanded to 10 other States where another 200 workers were employed in this type of endeavor.

In addition, the EPA has utilized these older workers in their 10 regional offices in the community noise program.

The primary task of these participants is to assist State and local governments with environmental control programs. Many of these programs are mandated by Federal law but left to the States to implement, and without sufficient personnel or funding, the States are having great difficulty complying.

An example of this is the survey of drinking water sources required under the Safe Drinking Water Act of 1974. Iowa utilized older workers from this program to conduct this survey. Without this assistance, the survey would have been done at a significantly greater cost to the State and the public.

I would like to take note, Mr. Chairman, that this morning I sat as a member of a subcommittee of the Agriculture Committee, of which the distinguished member, Mr. Brown from California, is the chairman. The subject of discussion this morning was a markup of the Federal Insecticide, Fungicide, and Rodenticide Act, which is the responsibility of the EPA.

In the testimony by the Agency at that time, under a line of questioning that paralleled very closely what I heard from the preceding panel, it was brought out that there is a great need to more, and that the key to learning more is monitoring, and in this instance, it had to do with the movement of pesticides into the food chain, and things of this kind.

I would submit, Mr. Chairman, that there is a very long list of areas related to R&D in the EPA in which senior citizens, on a part-time basis, can make a major contribution.

So what I am saying to you is that the principal benefit of this program would be to help the EPA stretch its already-limited budget and to assist older Americans in obtaining productive and meaningful employment by allowing to give future generations the benefit of a cleaner and safer environment.

Mr. Chairman, I ask that the text of my proposed amendment be printed following my testimony, and I thank the chairman and the members of the committee for allowing me to speak briefly before you today.

Mr. SCHEUER. There being no objection, it is so ordered.

[The prepared statement of Mr. Evans follows:]

TESTIMONY BEFORE THE COMMITTEE ON SCIENCE AND TECHNOLOGY

SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT

BY THE

HONORABLE COOPER EVANS

April 27, 1983

Mr. Chairman, Members of the Committee, I deeply appreciate the opportunity to appear before you today to offer testimony during your consideration of the Research and Development programs of the Environmental Protection Agency.

Mr. Chairman, as the you and the Members of the Committee might remember,in October of 1982, during the Floor consideration of the EPA R&D bill, I offered an amendment -- with the support of both you, Mr. Chairman, and the distinguished Ranking Minority Member -- which would authorize the Administrator of the EPA to implement a program called the Senior Environmental Assistance Program. I was successful during Floor consideration --very unfortunately, the President vetoed the R&D bill.

I am here today to ask for your support in my effort to provide for an authorization for the Senior Environmental Assistance Program. Currently, this program — which is based on a highly successful demonstration project — is being carried-out on an *ad-hoc* basis. I believe this program provides too great a service to our older Americans to be allowed to continue on such an informal arrangement.

As just one example of the type of work that this program accomplished, I would like to tell the Committee about one of the pilot programs which was carried out in my state of Iowa. The Iowa Department of Agriculture utilized nearly 100 senior workers to perform a pesticide inventory program. The demonstration was then expanded to 10 additional States where another 200 workers were employed. In addition, the EPA has utilized these older workers in their 10 regional offices in the community noise program. The primary task of these participants is to assist State and local governments with environmental control programs. Many of these programs are mandated by Federal law, but left to the States to implement. Without sufficient personnel or funding, the States cannot comply. An example of this is the survey of drinking water sources required under the Safe Drinking Water Act of 1974. Iowa utilized older workers from this program to conduct this survey. Without this assistance, the survey would have been done at a significantly greater cost to the State and the public.

Mr. Chairman, last year during Floor consideration, my amendment had the support of the National Resources Defense Council, the Sierra Club, and the Friends of the Earth. The Administration has expressed support for this type of senior employment program. In addition, Senator Chafee has introduced legislation similar to my amendment. Currently he has 13 cosponsors for his bill, including the Chairman and the Ranking Minority Member of the Senate Committee on Environment and Public Works.

During the demonstration project, the AoA called upon the Foundation of Applied Research (FAR), an independent contractor, to conduct an evaluation of the demonstration project. It concluded that:

> "With regard to the costs of the program, we could have simply stated that the program was a grandiose success because it helped the environment in ways that cannot be easily measured in dollars and cents, but must surely be substantial. Or we could have said that the program was cost beneficial because it provided employment for a segment of the population which is too often presumed to be underproductive. These benefits are real and they are the greatest benefits of the program."

But even against a tough, analytic yardstick, the Senior Environmental Assistance concept is productive. The FAR evaluation revealed that employment of these senior citizens resulted in savings of 16.4 percent of labor costs. The program was so successful that FAR recommended it be expanded to all 50 States, and that existing States programs be increased.

Mr. Chairman, my amendment, which I was successful in including of the Floor last year, and which I come before the Committee today in support of, authorizes expanded use of senior citizens in both EPA's national and regional offices. It would allow for the employment of eligible older Americans to work within the EPA on such activities as air monitoring and emission testing, pesticide inventory and control, water supply sampling and monitoring, technical libraries, and public information, carcinogenic surveys and follow-ups, hazardous materials routing surveys, rural health screening, and noise abatement and control. It would further the nation's goals of providing productive, meaningful employment to older workers, and provide the benefits of a cleaner, safer environment to future generations.

An added benefit to this program would be to help the EPA stretch its already limited budget and assist older Americans to obtain productive and meaningful employment by allowing them to give future generations the benefits of a cleaner and safer environment.

Mr. Chairman, I request permision that the text of my proposed amendment br printed following my testimony.

I thank the Chairman and the Members of the Committee for allowing me the time to come before you today.

(The text of an amendment proposed by Mr. Evans of Iowa:)

SEC ____. (a) To carry out the purposes of this Act, the Administrator of the Environmental Protection Agency is directed to develop a Senior Environmental Assistance Program, designed to assist Federal, State. and local environmental agencies in carrying out programs authorized under this Act.

(b) In providing assistance under subsection (a),the Administrator shall utilize, to the fullest extent possible, existing older American employment programs, as provided for in Sec. 105(b)(4) of Public Law 95-478.

(c) The Administrator shall not make any grant to, or enter into any agreement with, any State, or local environmental agency for funding of any activities under this section unless such agency certifies that such activities will supplement and not supplant any existing jobs.

(April 13, 1983 08:49 AM)

Mr. **Scheuer**. Let me congratulate the gentleman on his leadership in promoting this excellent amendment. I cannot believe that there will be a single opposing voice on our subcommittee, and I think I can virtually assure the member that the language will be in there.

There is precedent for this kind of proposal, and I suppose my modesty should prevent me from identifying the author, or at least the House author, of a bill about 15 years ago. On the Senate side, it was called the Nelson-Scheuer program. On the House side, of course, it was called the Scheuer-Nelson program. [Laughter.]

It was to promote aids in public service—people without a lot of education credentials who were still capable of doing an excellent job in public service.

My aid program was mostly what you would call, I suppose, urban types of aids—school aids, housing aids, police aids, drug enforcement aids, and the like, and it was tremendously successful. We provided on-the-job training for these adults, many without even high school education, and they performed brilliantly.

Senator Nelson's bill provided, interestingly enough for you, aid programs in just the kind of thing you are talking about, conservation programs of all kinds, environment programs, designed mostly for rural areas.

Senator Nelson was an outstanding gentleman. At one time in conference, when this bill was considered in conference, and this was the first year of my first term, and I didn't have enough seniority at that time to be a conferee, and we didn't have the rule then that a Member, no matter how junior, whose work product was being considered would be a conferee; at one time it was recommended that, because his component, dealing mostly with rural areas, was less costly than mine, we just go with that and just drop the urban section and move with the rural section.

Senator Nelson, to his everlasting credit, said:

> No; they are both good programs. Scheuer has worked hard; I have worked hard; we independently produced two excellent programs that dovetail perfectly, and I think they are both meritorious, and it makes one program where, in effect, the whole is greater than the sum of the parts, and we ought to move with the whole thing, and I am perfectly willing to take my chances on sinking or swimming, but together.

It came out of conference. It did pass, and Senator Nelson refused the opportunity of jettisoning the urban portion in order to save his rural portion. He is a tremendous human being, and his loss is a very great one.

I think, reaching across party lines, you would also admit that Senator Nelson made a tremendous contribution during his years in the Senate and would be 1,000 percent in support of your amendment. So there is some tradition, some experience, that proves beyond a peradventure that your proposal is not only sensible on its face as a theoretical matter but has worked, can work, will work, and not only will give senior citizens something useful and constructive to do—perhaps on a part-time basis which suits them—but provides a whole wellspring of talent and caring out there among our senior citizens that we should long since have tapped productively.

So I congratulate you for your leadership. One cannot guarantee anything around here, but I can vitually assure you that your language will be in our bill as we consider it in subcommittee. Hopefully, it will emerge unscathed through the legislative process, and, hopefully, you will use your good offices with the President, who happens to be of your party, to sign the Evans bill. We will give you credit for the whole bill if you can get him to sign it. [Laughter.]

Mr. EVANS. Well, I thank the chairman for his kind words of support and assure him that if I had been there when he was making those efforts, I would have supported him in his endeavor.

I assure him that I will use what little influence I have with the White House to get the legislation signed.

Thank you very much for the opportunity to appear.

Mr. SCHEUER. I thank the gentleman for his kindness in coming before us.

All right, we will now move on to the second panel, health effects of hazardous waste.

Dr. Bruce Karrh of the Chemical Manufacturers Association and Dr. Ellen Silbergeld of the Environmental Defense Fund, please come forward. Perhaps, in the course of all of your testimony, you will tell us the magical catalytic process by which the CMA and the EDF got together in this lawsuit that, in effect, is telling the EPA, get on with your mission. You have not performed the research, A, that is going to help the public, and, B, that is going to help the industry do their job on a basis that is sensible and profitable. Give us the secret of your success in getting together.

Your testimony will be printed in full, both of your prepared testimony, the conclusion of your oral presentations. So, Dr. Karrh, why don't you speak to us informally for 7 or 8 minutes, and then Dr. Silbergeld, and then I am sure we will have some questions for you.

STATEMENT OF BRUCE W. KARRH, M.D., GENERAL DIRECTOR, MEDICAL, SAFETY, AND FIRE PROTECTION, E. I. DU PONT DE NEMOURS & CO., INC., ON BEHALF OF CHEMICAL MANUFACTURERS ASSOCIATION

Dr. KARRH. Thank you, Mr. Chairman and members of the subcommittee.

My name is Bruce Karrh. I am general director of medical, safety, and fire protection for the DuPont Co.

I appear today before your subcommittee as chairman of a Chemical Manufacturers Association, or CMA, work group which is assessing whether the Nation faces a public health problem from waste sites.

Much has been written and portrayed about the health risks of populations in the vicinity of hazardous waste sites. Most of what has been reported runs counter to the experience of the CMA member companies. We have not observed significant health problems associated with the disposal of industrial waste.

In my testimony today, I will share with you some of the information we have reviewed in the area of epidemiology studies which support this conclusion. I will also address the important need for organizing the agency that is established by the Comprehensive Environmental Response Compensation and Liability Act, or Superfund, within the Public Health Service to conduct research and data collection on health effects of exposure to hazardous waste.

I will also make some observations concerning what areas the new agency should focus on in carrying out its mission. Finally, I will describe CMA's plans for further work in this area.

While we have not observed an increased incidence of disease associated with exposure to industrial wastes, we are aware of the toxic nature of some of the waste that is generated by our facilities. We are also keenly aware of the public perception of danger as a result of hazardous waste disposal sites.

In view of these concerns, CMA established the work group which I chair to assess the validity of this perception. We have reviewed the available epidemiology studies of populations exposed to chemicals from disposal sites. Those studies contain no scientifically valid evidence of chronic illness resulting from exposure to industrial waste.

We have also reviewed extensive epidemiology studies of workers exposed to chemicals in the workplace. These studies demonstrate that chemical industry workers have a lower incidence of cancer and deaths from all diseases than does the general public. Although not conclusive, of course, these data provide considerable reassurance that the presence of these same chemicals in the environment is not causing a significant health problem.

I would like to review with you two examples of valid, in-depth epidemiology studies. The first was a study conducted by the New York Department of Health to determine whether the population in Niagara Falls, New York, which could have been exposed to wastes from the Love Canal site, had suffered any increased incidence of cancer. The data employed in this epidemiology study were obtained from the New York Cancer Registry for the period 1955 through 1977.

After reviewing the data, the Department of Health concluded that the data showed no evidence of higher cancer rates associated with residence near the Love Canal site than in the entire State outside of New York City. Cancers reviewed included respiratory cancer, liver cancer, lymphoma, and leukemia.

The only increased incidence noted was for respiratory cancer, but the incidence in the population surrounding Love Canal was not significantly different from the rest of Niagara Falls. Thus, they concluded that there was no evidence that the lung cancer was associated with the toxic wastes.

The second study investigated the health effects on the general population of chemical exposure in highly industrialized Contra Costa County, Calif. This 4-year study, which was conducted by the California Health Department cancer epidemiology unit, was financed by both State and Federal funds. It found that smoking, and not air pollution or chemical exposure at work or from dump sites, was the most likely explanation of higher rates of lung cancer in Contra Costa County.

Thus, the only epidemiology studies known to us which scientifically analyzed the effects of chemicals from waste disposal sites in the surrounding community suggest no causal link between proximity to the sites studied and cancer incidence.

Nevertheless, we believe that additional studies are needed to provide a factual basis for use in consideration of the important issues of public policy relating to waste disposal. However, in view of the observations of no hazard to health, we feel that we have the time to do the careful studies required for valid answers. We plan to continue to press to have these studies done as soon as possible.

With regard to the tupes of studies needed, we suggest that the recommendations which were published in 1981 by the sciences and public policy program of the Rockefeller University, and edited by William W. Lowrance, provide excellent fundamental guidelines as to how to proceed.

Briefly, those guidelines are as follows:

Describe the existence and physical distribution of hazardous chemicals in disposal sites;

Estimate the human exposure to the hazard;

Assess the health effects on individuals;

Evaluate the sum societal health burden; and then

Appraise and choose among options for social management.

As indicated in my earlier remarks, there are scientifically valid studies of only two waste sites. Both studies failed to show a link between proximity to a site and an increased incidence of cancer. We recognize that there are many other sites and there are other chronic effects that could arise. We are also aware of the grave public concern over this problem and the need for prompt, credible studies consistent with the approach mentioned above.

It was for this reason the CMA petitioned the court to intervene as a plaintiff in the Environmental Defense Fund suit against the EPA and the Department of Health and Human Services.

CMA strongly supports adequate funding of the Agency for Toxic Substances and Disease Registry, or the Agency, as provided in section 104(I) of Superfund. Superfund assigns many tasks to the new agency, but we believe some require priority attention. These are:

The Agency should undertake epidemiology studies of those priority sites for which protocols have been developed or are being developed by the Centers for Disease Control, or CDC.

The Agency should develop protocols for epidemiology studies on additional sites where exposure assessments show the potential for exposure of a population is or has been high. These protocols should, to the extent consistent with good science, provide for similar and compatible studies.

This approach will better enable data to be compared and will contribute to improved interpretation of data and more efficient studies. Appropriate studies based on these protocols should be carried out as soon as practicable.

The Agency, either itself or as coordinator for efforts on a State or local level, should establish registries for the sites where exposure of significant populations to hazardous materials is expected to occur. These registries should develop site-specific data on those chronic diseases which are useful for epidemiology studies. These data will allow us to draw conclusions as to the impact of disposal sites on the health of populations near them.

As I indicated, these registries should be specific to the disposal site being studied and should include not only cancer, but, where appropriate, other diseases such as chronic lung disease, metabolic disease, liver disease, blood disorders and birth defects.

We caution, however, that these registries be developed with care to protect all the relevant privary interests that are involved. That is, the identity of the people that are included in the registry and the people that are or could be affected by the findings of the registry need to be protected. In addition, such registries should be used by Agency scientists solely for the purpose for which the registries are intended.

The establishment of a broad national registry of all potential diseases and exposures is neither feasible nor desirable. The funding and agency resources required to undertake this task are just not justified.

Therefore, in summary, it is our position that in the immediate future the Agency should:

Determine those sites at which people are being exposed or are likely to be exposed to hazardous materials;

Undertake those epidemiology studies on the priority sites for which protocols have been or are being established;

Develop broadly applicable protocols for future epidemiology studies and conduct such studies as are needed; and

Establish site-specific registries in a manner that will enable future epidemiology studies to be carried out with more confidence.

Your committee should assure that there is adequate funding for these research efforts.

We should also like to share with your committee the plans that CMA has for the near-term future. CMA is committed to cooperate in efforts to study this problem.

In addition to our review of available data as mentioned earlier, CMA has also contracted with the universities associated for research and education in pathology, better known by the name of UAREP, to do a feasibility study on how the best currently available data and scientific expertise could quickly reveal the extent of the problem.

UAREP is a consortium of 15 major universities and was created in 1964 at the request of the National Academy of Sciences and the Department of Defense to do research in the field of human disease.

The feasibility study will review and analyze existing data sources, develop key criteria for defining health effects to be considered, identify those scientists who have the needed expertise, and develop a work plan for completing a more comprehensive study.

UAREP began the feasibility study in mid-March and should complete it this summer.

A subsequence comprehensive study would seek to pinpoint other data needed to reach a conclusion. Our ultimate objective is to identify the nature and scope of health effects that might result from waste sites. We believe these studies will be useful as a foundation for a more detailed work plan under which industry, the Federal Government, and State and local governments can coordinate activity and resources to undertake an appropriate study plan.

In closing, I wish to assure you, Mr. Chairman and members of this subcommittee, that CMA's members will continue to take whatever action is appropriate to assure the health and safety of the public. Thank you.

[The prepared statement of Dr. Karrh follows:]

CMA

CHEMICAL MANUFACTURERS ASSOCIATION

WRITTEN
TESTIMONY
OF

BRUCE W. KARRH, M.D.
GENERAL DIRECTOR OF MEDICAL, SAFETY AND FIRE PROTECTION
E. I. DU PONT DE NEMOURS AND COMPANY

ON BEHALF OF
CHEMICAL MANUFACTURERS ASSOCIATION

BEFORE
THE SUBCOMMITTEE ON NATURAL RESOURCES,
AGRICULTURE RESEARCH AND ENVIRONMENT
OF
U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY

APRIL 27, 1983

Introduction

Mr. Chairman, members of the subcommittee, my name is Bruce W. Karrh. I am the General Director of Medical, Safety and Fire Protection for the Du Pont Company. I appear today before your subcommittee as chairman of a Chemical Manufacturers Association (CMA) work group which is assessing whether the nation faces a public health problem from waste sites. CMA is a non-profit trade association whose company members represent more than 90 percent of the production capacity of basic industrial chemicals in this country.

Background

Much has been written and portrayed about the health risks of populations in the vicinity of hazardous waste sites. Most of what has been reported runs counter to the experience of the CMA member companies. We have not seen evidence of significant health problems associated with the disposal of industrial waste. In my testimony today, I will share some of the information the CMA work group reviewed that supports this conclusion. I will discuss the important need for organizing the agency established by CERCLA within the Public Health Service to conduct research and data collection on the health effects of hazardous waste. I will also make some observations concerning what areas the new agency should focus on in carrying out its mission. Finally, I will describe CMA's plans for further work in this area.

While we have not observed an increased incidence of disease that would be associated with exposure to industrial wastes, we are aware of the toxic nature of some of the waste that is generated by our facilities. We are also aware of the public perception of danger as a result of hazardous waste sites. This resulted in both public and Congressional concern that led to enactment of CERCLA, or Superfund. These concerns have not, however, subsided since enactment of CERCLA. Therefore, CMA decided to establish a work group in late 1982 to review the available facts and attempt to assess the true extent of the problem.

In our consideration of the issue, we found but two epidemiology surveys which we consider valid, of populatons relative to waste disposal sites. One of these was a study done by the New York Department of Health which considered the incidence of cancer in the Niagara Falls, New York, population that could have been exposed to waste from the Love Canal site. A second studied the relationship of lung cancer incidence in Contra Costa County, California, to ambient levels of air pollution. Neither study found a relationship between potential exposure to chemicals from a waste site and increased incidence of cancer in the populations studied. We recognize that cancer is not the only health hazard which can be associated with exposure to chemicals, but it is certainly the most feared.

We have also reviewed many studies that have been conducted by the government and by industry to determine whether occupational exposure to toxic chemicals has resulted in an increased incidence of chronic disease. Reliable data have been gathered by several companies for use in epidemiologic studies of employees in industrial chemical operations. Based upon our own experience and what exposure data are available, we believe that, in general, such employees would have been exposed to higher concentrations of chemicals than the population around waste disposal sites. Hence, occupational exposure and health data should provide an indication of the health effects that might be expected if similar exposure patterns were encountered by the public. Since we have seen no significant increased incidence of chronic disease among employees in the chemical industry, we conclude that widespread increased incidence of chronic disease among the public is also unlikely. To test this conclusion, we reviewed the results of a number of epidemiology studies[1] of chemical industry workers. In general, these studies found that chemical workers have a lower death rate from cancer and from all causes combined than the general public. We recognize that working populations generally have lower death rates than the general public, but nevertheless believe that these studies are significant and form the basis for at least a preliminary reassuring conclusion concerning the hazards of exposure to industrial waste.

For the reasons mentioned above, CMA's view now is that evidence of an urgent national problem deriving from public exposure to hazardous waste is not at hand. But we know that further scientifically sound information is needed to reveal the true extent of the problem. We also know the public needs reassurance that measures are underway or under study to resolve the questions that have been raised.

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[1] See Appendix A.

Study Plan Guidelines

With regard to what needs to be done to properly assess the health risks of hazardous waste sites, the Sciences and Public Policy Program of the Rockefeller University[2] in 1981 published an excellent set of guidelines. They are:

1. Describe existence and physical distribution of hazardous chemicals;
2. Estimate human exposure to the hazard;
3. Assess health effects on individuals;
4. Evaluate the sum societal health burden; and then
5. Appraise and choose among options for social management.

Love Canal Studies

We can demonstrate the critical need for such a scientific approach by reviewing previous epidemiology work relative to waste sites. The Love Canal site is well known to the world as a site from which wastes escaped and potentially exposed the surrounding population to hazards. Public panic resulted from the disclosures in which the media, based upon preliminary or inadequate studies, made sensational claims of harm resulting from the leaked wastes.

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[2] W. W. Lowrance, Ed., Assessment of Health Effects at Chemical Disposal Sites, 1981, The Rockefeller University.

Two early studies of the health effects of this site contributed greatly to the alarm. One was an EPA study which suggested the occurence of rare chromosome abnormalities as a result of exposure to Love Canal waste. The second was a study by Beverly Paigen which suggested increased incidence of nervous disorders, birth defects and reproductive abnormalities. However, a panel of five scientists appointed by New York Governor Carey, including Lewis Thomas (Chairman), Chancellor of Sloan-Kettering Cancer Center, and Arthur Upton of New York University and former head of the National Cancer Institute, sharply criticized these studies. The EPA study was dismissed as "inadequate" and damaging "to the credibility of science" and the study by Beverly Paigen was described as "literally impossible to interpret" and a study that "cannot be taken seriously".

In contrast to these early inadequate studies, the New York State Department of Health did a scientifically sound epidemiology study using data from the New York Cancer Registry for the period 1955-1977.[3] The authors concluded that the data showed no evidence of higher cancer rates associated with residence near the Love Canal site than in the entire state outside of New York City. In addition, they said that rates of liver cancer, lymphoma and leukemia, which were selected for review, were not consistently elevated. Among other cancers studied, a higher incidence rate was noted only for respiratory cancer, but it was not significantly different from the rest of Niagara Falls, which has a slightly higher rate than the rest of New York State. Thus, the authors concluded that there was no evidence that the lung cancer rate was associated with toxic wastes buried at the disposal site.

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[3] Janerich *et al.*., "Cancer Incidence in the Love Canal Area", *Science*, Vol. 212, June 19, 1981, p. 1404.

Contra Costa County California Study

A second epidemiology study directed by Dr. Donald Austin of the California Health Department Cancer Epidemiology Unit investigated the health effects of exposure in an industrial area between Richmond and Antioch, California. This was a four-year study financed by both state and federal funds that found that smoking -- not air pollution or chemical exposure at work or from dump sites -- most likely explain the higher rates of lung cancer in Contra Costa County's heavy industrial areas between Richmond and Antioch.

These are the principal epidemiology studies that we are aware of that have scientifically analyzed the effect of waste sites on a population in the surrounding community. While these studies suggest no causal link between proximity to a dump site and cancer incidence, more work is necessary to reconfirm these findings. In particular, other health effects and additional sites should be studied.

The Comprehensive Environmental Response, Compensation and Liability Act, commonly known as Superfund, mandated such data collection. In Section 104(i), Congress called for a scientific program to "determine relationships between exposure to toxic substances and illnesses". This program may be composed of many elements, including epidemiology studies, surveys and screening. Superfund money -- raised primarily through a tax on the sales of certain basic petrochemicals -- is authorized to fund these studies.

CMA believes it is vitally important for the federal government to conduct a scientific program to develop valid information on the nature, extent and relationships, between exposure to hazardous waste and incidents of disease. Such a program would provide the scientific information on which to base appropriate programs for disease prevention and control.

As you perhaps know, the government has been slow to move. We think it ought to get on with the job. And in February, CMA intervened as a plaintiff in the lawsuit initiated by the Environmental Defense Fund against the EPA and the Department of Health and Human Services to compel those agencies to step up their efforts.

While both EDF and CMA have a common interest in the effective organization and funding of the ATSDR,* a basic difference in positions should be noted. EDF has premised its suit on an allegation that "Toxic substances are jeopardizing human health.... The failure to gather and disseminate information about these hazards and to treat those exposed to them is irreparably injuring the natural and human environment"

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* Agency for Toxic Substances and Disease Registry (ATSDR) established in Section 104(i) of CERCLA.

(EDF Complaint, p. 2). Thus, EDF's position is that it is an accepted fact that environmental exposure to hazardous substances is causing a widespread health problem. In contrast, CMA's review of available health effects data suggests that such a health problem does not exist. Notwithstanding CMA's and EDF's different approaches to this suit, we do share an important interest -- the need to understand the nature and extent of the problem.

Section 104(i) Tasks

Although the Department of Health and Human Services (HHS) has recently organized the ATSDR as provided in CERCLA, this alone is not acceptable to CMA. This new agency needs to take prompt and effective action to implement the response authorities established by Congress. Therefore, we recommend that Congress ensure that the agency be adequately organized and funded. Among those tasks assigned to the agency under CERCLA, we believe the following need priority attention.

Carry Out Protocols

> Undertake epidemiology studies of those priority sites for which protocols have been developed or are being developed for the Center for Disease Control (CDC).

The work that CDC has undertaken to develop study protocols for five of these sites should be supported so that the needed studies can be undertaken as soon as possible.

Develop Generic Protocols

> Develop protocols for epidemiology studies on additional sites where exposure assessments show the potential for exposure of a population is or has been high. These protocols should, to the extent consistent with good science, provide for similar and compatible studies. This approach will better enable data to be compared and will contribute to improved interpretation of data and more efficient studies. Appropriate studies based on these protocols should be carried out as soon as practicable.

The subcommittee should encourage that the additional sites selected for study be selected in an order which would consider the number, amount and identity of hazardous substances at the site, the population at risk, the physical distribution and potential for leaks from the site and the potential likelihood of adverse effects. A review of such data will enable EPA or the ATSDR to select those sites for study which will give meaningful answers early. In addition, the availability of relevant data should be considered. For example, states such as California, New York, Louisiana and Missouri have environmental health epidemiology capacility, cancer registries and the like which would facilitate such study. To study other chronic diseases it will also be necessary to select objective clinical measurements. At present there is no easy method for investigating mortality causes other than reviewing individual death certificates, and there is certainly no capability to investigate morbidity in the absences of an appropriate record system. What this says is that definitive answers will not be found soon.

Establish Site-Specific Registries

> The agency, either itself or as a coordinator for efforts on a state or local level, should establish registries for the sites where exposure of significant populations to hazardous materials could occur. These registries should develop site-specific data on those chronic diseases which are useful for epidemiology studies. This data will allow us to draw conclusions as to the impact of disposal sites on the health of populations near them.

It is important to establish a mechanism for recording serious diseases and death so that factual data on disease incidence and mortality can be readily obtained. The absence of cancer registries in some states seriously impedes obtaining meaningful information for effective studies. However, these registries should be specific to the disposal site being studied and should include not only cancer, but where appropriate, other diseases such as chronic lung disease, metabolic disease, liver disease, blood disorders and birth defects. We caution, however, that these registries be developed with care to protect all the relevant privacy interests involved. That is, the identity of the people that are included in the registry and the people that are or could be affected by the findings of the registry need to be protected. In addition, such registries should be used by Agency scientists solely for the purpose for which the registries are intended.

The effort of establishing appropriate site-specific registries is critical to long term resolution of the issue. Since the CDC is already coordinating similar activity, we recommend that the CDC undertake the establishment of needed registries or that CDC coordinate the activities of the states or local agencies in compilation of the disease data. As indicated above, such registries should compile data on diseases relevant to the particular site. We would also caution that the mechanism which is established be cost-effective and include only health effects that will be useful in establishing whether chemicals from disposal sites may have been the cause of the disease. We should avoid studies that are not based on meaningful tests, as in the case of Love Canal. Publication of studies which are not soundly conducted can have severe pyschological impact upon affected families.

The establishment of a broad national registry of all potential diseases and exposures is neither feasible nor desirable. The funding and agency resources required to undertake this task are not justified.

Literature Inventory

In contrast to the above described high priority tasks, CERCLA, Section 104(i) provides that the Administrator establish and maintain an inventory of literature, research and studies on the health effects of toxic substances. We believe this function is already being done by such HHS agencies as the National Library of Medicine and by EPA itself. Thus, CMA sees no need for ATSDR to expend resources in this area. What is needed, however, is a critical assessment of the studies in the literature to enable ATSDR or others to make most efficient use of the literature which exists.

Summary

In summary, it is our position that in the immediate future the agency should:

- o Determine those sites at which people are being exposed or are likely to be exposed to hazardous materials.
- o Undertake those epidemiology studies on the priority sites for which protocols have been or are being established.
- o Develop broadly applicable protocols for future epidemiology studies and conduct such studies as are needed.
- o Establish site-specific registries in a manner that will enable future epidemiology studies to be carried out with more confidence.

Your committee should assure that there is adequate funding for these research efforts.

Congress must recognize that these are highly complex tasks, that great dedication will be required and overnight solutions or answers will not be forthcoming. CMA does agree, however, that it is necessary to get on with the task of resolving the issues and answering the questions so prominent in the minds of the American public about what risks may be posed by disposal of toxic wastes.

CMA Plans

CMA and its member companies are committed to cooperate in efforts to study this problem. In addition to our review of available data as mentioned earlier, CMA has also contracted with the Universities Associated for Research and Education in Pathology (UAREP) to do a feasibility study on how the best available data and scientific expertise could quickly reveal the extent of the problem. A subsequent more comprehensive study would seek to pinpoint other data needed to reach a conclusion. The ultimate objective is to identify the nature and scope of health effects that might result from exposure to materials associated with waste sites.

UAREP is a consortium of 15 major universities. It was created in 1964 at the request of the National Academy of Sciences and the Department of Defense to do research in the field of human disease. In the feasibility study, UAREP will provide its independent judgment on the available data and the conclusions that can be drawn from these data. We want UAREP's independent professional opinion, and that is what they intend to give us.

UAREP began the feasibility study in mid-March and should complete it this summer. The feasibility study will identify suitable data, develop key criteria for defining health effects to be considered, identify the scientists who could work on the project, and develop a work plan for a more comprehensive study. This could be used as the stepping stone to a more detailed work plan under which industry, the federal government and the state and local governments could coordinate activity and utilize appropriate resources to undertake an appropriate study plan. Congress should ensure tnat adequate funding of government participation is assured.

Conclusion

In closing, I wish to assure you, Mr. Chairman and members of this subcommittee, that CMA's members will continue to take whatever action is appropriate to assure the health and safety of the public. Thank you.

APPENDIX A

GENERAL MORTALITY AND MORTALITY DUE TO CANCER AMONG WORKERS IN THE CHEMICAL INDUSTRY

Reliable epidemiological data for employees in industrial chemical operations have been gathered by several companies. Such employees generally have greater exposure to chemicals than people living near chemical disposal sites or chemical plants. Hence, employee data should provide an idea of the health effects that might be expected in an exposed public. If few adverse effects of chemicals are seen among employees, adverse effects are unlikely in the public.

Table 1 shows that chemical workers have a lower mortality from all causes than the general public. Table 2 shows that they have a lower cancer mortality. Similar mortality figures are often observed in working populations, and one can draw only limited conclusions from them. However, the tables are good evidence against assertions that association with chemicals is causing an epidemic of occupational cancer. We have seen no increased incidence of chronic disease in chemical industry employees; therefore, it is unlikely that the general public, with its probable lesser exposure, would have an increased risk of chronic disease as a result of waste sites.

TABLE 1

MORTALITY (SMR) FROM ALL CAUSES

Report (Reference)	SMR
U.S. Public Health Service (1)	89
Du Pont (2)	68
Dow (3)	81
Dow (4)	81
Exxon (5)	92
API (6)	69

TABLE 2

CANCER MORTALITY (SMR)

Report (Reference)	SMR
Du Pont (2)	81
Du Pont (7)	82 (SIR = 79)
Du Pont (8)	50
Dow (3)	99
Dow (4)	95
API (6)	81
Rushton (9)	89
Gulf (10)	95
Shell Canada (11)	89
Rushton (12)	87

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3. M. G. Ott. B. B. Holder, and R. R. Langner (Dow), "Determinants of Mortality in an Industrial Population", J. Occ. Med., 18, 171 (1976).
4. Public Issues, Oct. 29, 1982 (a Dow release). A summary of an unpublished update of Reference 3.
5. J. Occ. Med., 24, 202 (1982), "Epidemiological Study of Baton Rouge, LA, Refinery and Chemical Plant Workers" (Exxon).
6. Tabershaw-Cooper, "A Mortality Study of Petroleum Refinery Workers", API Report OH-1 (20,163 workers employed at least one year 1962-71).
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10. C. P. Wen (Gulf), paper presented at APHA meeting 11/3/81; 16,880 employees at Gulf refineries.
11. Therioult and Goulet (Shell), J. Occ. Med., 21, (5), 1979; 1,205 Canadian refinery workers.
12. Rushton and Alderson: study of 23,358 men employes in 3 British oil companies (published?).

Mr. SCHEUER. Thank you very, very much, Dr. Karrh.

Now we will hear from Dr. Silbergeld.

STATEMENT OF DR. ELLEN SILBERGELD, ENVIRONMENTAL DEFENSE FUND

Dr. SILBERGELD. Thank you, sir.

I am Ellen Silbergeld, chief toxics scientist at the Environmental Defense Fund in Washington.

Prior to coming to EDF last year, I was a research scientist, most recently chief of neurotoxicology at the National Institutes of Health.

And so I speak with great personal concern and a history of involvement in the area of research, and with deep personal admiration for many of the research scientists currently employed by the Environmental Protection Agency.

Although my topic is restricted to the area of hazardous waste, I think it is important for this committee to note with alarm, as other committees have and you, yourself, Mr. Chairman, the perilous state of national laboratories and centers of excellence in this country. The EPA laboratories in Research Triangle, Cincinnati, and Las Vegas, the National Centers of Excellence in Environmental Health are in desperate straits owing to lack of funding over the last few years. They lack the most modern equipment, they are understaffed, and they are losing the best and brightest of younger scientists who might be drawn into research careers so valuable to elucidating the questions which you have heard raised here today.

In addition, many of the comments that I am going to make about budget requirements for adequate work in the Agency related to hazardous waste under Superfund obviously have implications for good science, good regulatory policy, and good management throughout the Agency.

They specifically break down into four areas: Related to health, related to monitoring and environmental analysis, related to cleanup and to waste management, and related to information and data elements on specific toxic chemicals.

Concerning health research, I am somewhat mystified that Dr. Karrh is interested in generating yet more data in the face of certainty that there is no bad news—perhaps we have a dearth of good news in this area, as in others. This is particularly peculiar coming so fast on the heels of reports from the Centers for Disease Control that out of 112 people surveyed in Times Beach for evidence of enzyme dysfunction in the liver, all 112 showed significant effects related to exposure to dioxin in that town. I think that is a very unhappy statistic. Unfortunately, it must drive us further to finding what we fear not to be good news in the future.

The areas in which health research requires immediate attention and greatly increased funding from Congress and oversight for the proper expenditures of that funding are primarily in the area of establishing registries, surveys, and mechanisms for studying potential and actual health effects.

It is important to note that the United States is one of the few major industrialized countries in the world without a coordinated national registry for serious disease. We have only recently established a National Death Index in this country. The value and importance of such registries cannot be overemphasized. If Superfund is the mechanism which sets up such registries, then Congress should be even prouder of the work that it did in passing that legislation. Finland, Denmark, Sweden, and Germany are only a few of the countries that have been able to pinpoint specific chemicals causing hazard to the general population as well as their occupationally exposed populations as a result of their registries.

In addition, with respect to health research, it is imperative that the Agency—and, indeed, all who are concerned with this problem—move beyond cancer as the primary indicator of adverse health effects. We all know the problems of long latency periods and the populations required to detect statistically significant increases in cancer. These are unlikely to obtain at many hazardous waste sites, and I am afraid I cannot share the confidence that UAREP and CMA have expressed frequently that such studies can be lumped together and compressed.

Mr. **Scheuer**. That who expressed?

Dr. **Silbergeld**. UAREP, the universities' group that Dr. Karrh referred to, which CMA is currently contracting to provide them expertise in this area.

Mr. **Scheuer**. Just for the record, what is the name of that group?

Dr. **Karrh**. Universities Associated for Research and Education in Pathology. The acronym is UAREP.

Mr. **Scheuer**. Thank you.

Dr. **Silbergeld**. We have a great need to move beyond cancer as the primary indicator of adverse effect. We need to move into the area of biological epidemiology and biochemical indicators, that is, presymptomatic, predisease indicators of exposure which allow us to intervene and radically redirect regulatory and cleanup policies in this country. This whole area of exposure indicators must be more comprehensive and more adequately reflect the state of the art, in such areas as measuring DNA adducts. This is essential not only for our policies and direction of activities under Superfund but also for the assessment of exposure that is ongoing currently in the agency under RCRA, Superfund, the Clean Water Act, the Clean Air Act, and the Toxic Substances Control Act.

With respect to the second issue, which is related to monitoring and environmental analysis, I think this was recognized, as Dr. Karrh pointed out, appropriately as the first guideline of attention at the Rockefeller University conference. Without adequate monitoring, we will not ever know where we stand.

The EPA's performance in its environmental assessment at Love Canal, which was discussed extensively in Congress last year, is, I think, in the kindest terms, a disaster from the scientific point of view. It reveals a total lack of understanding of the essential elements of quality analysis and quality control, of research management, as well as a lack of in-house ability to perform such studies, or to respond to national needs.

I would suggest that Congress give very serious thought to enabling this agency not to be dependent upon a contract mechanism, which is difficult to activate reliably in a quick time to have inhouse a capability analogous to that of CDC, to respond to serious incidents of environmental contamination, so that the agents which may have been released into the general environment can be quickly and reliably identified.

We saw months of problems in Missouri, and many of the private agonies that individual citizens went through that had to do with lack of data and lack of ability of the agency to get reliable data to people.

I can give you many examples of why the Agency is in trouble on this issue. For example, its extraction procedures are out of date and, in many cases, irrelevant. They call for aqueous extractions of materials solvble in solvents, and when these compounds do not appear in aqueous extractions, then it is stated that they are not present in the environmental sample. This is clearly way behind the level of state-of-the-art analysis. It relates back to my first point about the generally dilapidated state of national laboratories in this country.

The third topic I would like to address relates to clean-up of these sites and to the general problem of waste management. Congress heard earlier this year from Ms. Lavelle that the EPA had a dramatic new technique for cleaning up PCB's in Arkansas which involved the spraying of polyethylene glycol. When it was pointed out that this only worked in an anhydrous state, it was revealed again the problems this Agency has in bringing advanced, appropriate technology to issues of national concern and even emergency, in some cases, in the area of hazardous waste.

We are all waiting with some alarm to know what the Agency intends to do with the tons of contaminated soil it will eventually have to take out of Missouri. Will we repeat in this country the scandal that is just being revealed in Europe where, as far as we know, the dirt from Seveso went possibly into the North Sea or into the forests of East Germany? It is essential that EPA continue its research in this area and be able to put forward effective and innovative demonstration projects as these are required. Otherwise, the entire thrust of Superfund is meaningless if we are unable to adequately clean up any of these dangerous chemicals.

The final point of research which cuts across the entire mission of the Agency as well as Superfund relates to defining data elements for chemical assessment.

I was extremely concerned, in conversations with the Administrator, Joe Cannon, earlier this year that under the area of toxic substances control, no attention would be paid to reproductive effects because the Agency did not know how to assess them.

Mr. SCHEUER. Do we know how to assess them?

Dr. SILBERGELD. There are many scientists working in this area. There are organizations on the international level such as the Organization for Economic Cooperation and Development, whose Committee on Reproductive Toxicology I served on as an expert. There are indeed ways of assessing reproductive toxicology. These require further development and refinement, but I think we would all agree that this is an area of potential health effects which is of great concern to everyone.

In addition, we need—and this goes back to my earlier point about widening our horizons beyond cancer as an end point—we need to be aware of and learn how to discern, both in terms of new chemical testing and in terms of hazardous waste management, the types of health effects which may indeed be extremely costly in both a valued and an invaluable sense to our society. These are the chronic—possibly reversible but still quite significant while occurring—detriments to the quality of life. Here I think of effects of irritation, sensitivity, and the whole range of neuropsychiatric dysfunctions which are exemplified by pollutants such as lead.

Mr. **Scheuer**. Well, of course, to the extent that lead causes brain damage, that is mostly irreversible, isn't it?

Dr. **Silbergeld**. That is correct. The easy labeling of health effects as reversible or irreversible is something that needs to be scrutinized very carefully. Many so-called reversible effects, if they occur early in development of an organ, prenatally or in the early neonatal period, may have damage on that organ's development which is very difficult to reverse.

Our concern over the settlement of our now-joint suit with the Chemical Manufacturers Association extends beyond the undertaking of certain model studies at dump sites. We perceive that the issue of hazardous waste, as it was comprehended by Congress, covers a wide range of potential interactions of human beings with a very wide range of chemical substances.

This provides an opportunity for increasing our knowledge of the interaction of human health with chemical xenobiotics, and we should take every opportunity not only to use those skills we now have but also to insure that, as we develop new knowledge, we will be able to apply that for the betterment of humans who are, unfortunately, exposed to these substances.

Thank you very much.

Mr. **Scheuer**. Thank you very much, both of you, for very stimulating testimony.

Congressman Brown of California?

Mr. **Brown**. Since we were referring to lead here, is there any scientific dispute as to whether or not lead in the tissues of a human being is damaging to the health?

Dr. **Silbergeld**. If I may, I have spent 10 years working on the neurotoxic effects of lead at Johns Hopkins and at the National Institutes of Health.

I think it is reasonable to state that it is the general consensus of all scientists that lead is a purely toxic substance without known beneficial effect at any level within the cell. What is of concern, of course, is the level at which exposure induces effects that we consider unacceptable.

From the biochemical point of view, as was noted by the U.S. Court of Appeals, significant biochemical alteration occurs when blood lead levels—and that is the tissue we most commonly measure—reach a level of 10 micrograms per deciliter. Now, to put that number in some perspective, based on the most recent survey by the Public Health Service, just published, if that number is sufficient to provoke concern for significant health risks of lead, then approximately 57 percent of all American children under the age of 6 are in that area of significant concern.

Dr. **Karrh**. Congressman, if I may add a comment to that, I think that none of us would disagree that lead is a toxin to the cells. I think what Dr. Silbergeld said is that there may be some disagreement over what level it presents a toxic hazard to the cell, and it also would present a toxic hazard to different cells in different ways at different levels. The disagreement is not over the toxicity but over how much it requires to be toxic.

Mr. **Brown**. Is there any question about whether lead can be absorbed in the tissues, either through ingestion or through atmospheric means?

Dr. **Silbergeld**. There have been extensive studies on this subject, some of the best sponsored by industry, I am happy to note, in England by Dr. Barltrop's laboratory, who studied both humans and experimental animals.

There are numbers that can be attached to the amount of lead that is actually absorbed and retained in the body after either eating soils for example, contaminated with lead or lead paint chips, or inhaling airborne particulates.

One of the distressing factors is that there is a much higher fraction of lead absorbed by children as compared to adults.

Mr. **Brown**. During what period has this scientific knowledge been accumulated with regard to the effects of lead?

Dr. **Silbergeld**. I am glad you raised that question, sir, because I think that points back to some of the comments both Dr. Karrh and I made.

It has been accumulating significantly over the past 15 years, although nothing that has been said recently advances much from what Dr. Byers of Harvard first stated back in 1943. As is often the case in medicine, things circle around; more and more numbers are added, but premises which were stated a long time ago are frequently found to be true.

One of the issues that lead points to is that we must be very inventive and very careful when we look for effects of environmental chemicals, or we may miss them entirely. It was not until the application of very sophisticated neuropsychiatric batteries by Needleman's group, Ernhart's group, Yule's group in London, Winneke's group in Germany, and a variety of other investigators around the world, that the consensus of medical opinion has moved the danger level, the level at which lead poisoning is defined, from 60 to 40, and now to 30 ucg/dl. That is now the Public Health Service standard.

There will be convened this fall a new consensus group of pediatricians and toxicologists to discuss whether that number should be moved still lower. The British National Health Service has moved the level to 25, and I think there is growing opinion in this country that it should be moved to 20.

That movement, that reappraisal of the hazards of lead, was done only because of very, very intensive monitoring and investigation of human populations. If we stick to our conventional epidemiologic models and techniques and to our conventional gross end points of death or very serious disease, we will not move very far in protecting human health in this country.

Mr. **Brown**. Dr. Karrh, I find myself in agreement with the positive recommendations that you have made, and I would like to see this committee add its weight to those recommendations. I think they are appropriate, but I think it might help you to understand my views with regard to your testimony having to do with a lack of evidence with regard to the health effects of toxic dumps to relate an anecdote with regard to lead.

I introduced legislation about 25 years ago to ban lead additives in gasoline. I had the privilege of conducting hearings on that in California, at which we had the best national witnesses testify that there was no adverse health effect from lead in the atmosphere, and in fact they had statistics to prove that the higher the elevation of lead in the atmosphere, the more healthy it was.

I was a little skeptical at the time, but these were the best experts that could be produced by the petroleum industry, and they were quite sincere, I think, about the points that they were making.

Now, I cannot believe that you would testify that there are no adverse effects from the exposure to chemicals such as dioxin or kepone or PCB's or any of the other things that have been so much in the headlines. What I think your testimony is intended to indicate is that we really do not yet have the adequate number of validated epidemiological studies which confirm this, and I wonder if you would respond to that.

Dr. **Karrh**. Yes, Mr. Brown, I surely will. I think your story of the lead points out precisely what we are trying to say, and that is that, at the present time, we do not see any great number of people who are being harmed by disposal sites. The studies that we have done and the data that we have reviewed indicate that there is not a great number of people that are in need of current care or treatment.

But what this indicates to us is that we do have time to do the studies correctly and to do the studies that are needed to determine which sites should receive priority attention and direct our resources, which are limited, to those sites that do pose the greatest risk, rather than going out in some unstructured fashion and trying to address all the problems that may be present.

Our technology and our scientific knowledge advances, as was noted in your story about the lead, and the same will happen with the disposal sites. We have the time now to develop the data that we need in a proper fashion and then address the issues that arise from that appropriately.

Mr. **Brown**. Well, I really wonder how much time we have to do that. Obviously, I want to see us move as promptly as possible, and I think we will move more expeditiously, and we will receive better results, if we can do it in a cooperative rather than an adversarial framework.

I am looking forward to generating that kind of cooperation. But I took the same position that you are taking at a hearing on Friday out in California before 700 angry people who live in the proximity of a toxic waste dump, and my survival depends on convincing those people that they are not threatened, and I had a very difficult time doing it.

Dr. **Karrh**. Well, let me go into a little bit more detail on what our contract with UAREP, with the Universities Associated for Research and Education in Pathology, will help us to decide. This is a feasibility that will help us then decide for a more definitive study.

But what we hope to accomplish from this contract we have is to identify and determine the importance or relevance of the existing data; to establish preliminary guidelines on what constitutes a health hazard in relation to hazardous waste sites and how such hazards can be identified; identify the most knowledgeable who could carry out additional studies; and outline the organizations and procedures which could be employed in any additional studies.

We think that we can complete this task, and UAREP thinks they can complete the task, within 2 months of the contract date, which was mid-March. So by mid-May, the end of May, we think we can have some course of action planned and then begin to proceed with that in a timely and appropriate fashion.

Mr. **Brown**. Now, is UAREP the proper institutional mechanism to do what you have asked it to do? I am not familiar with it. I know of other university consortia, and I am proud of the work that they do, but I am not familiar with the capabilities of UAREP.

Dr. **Karrh**. UAREP does not have all of the expertise inside its own organization, but it has access to the expertise from other universities and other associations, and we felt that UAREP was the appropriate group to go to because they are totally scientifically independent, and they contracted with us on a totally independent contract that preserves their scientific expertise, and all we do is tell them what we want them to look at, and we provide the money, and then they tell us what they find. It actually was created in 1964 at the request of the National Academy of Sciences and the Department of Defense. So we feel that it is the appropriate agency to do the study we have contracted with them for.

Mr. **Brown**. All right, but the study is a preliminary study. It actually is aimed at outlining the protocols, I guess you might say. You have explained it in your testimony. After that phase is completed, then there has to be another phase, does there not?

Dr. **Karrh**. That is correct. This is a feasibility study. If UAREP comes back to us and says that these studies are feasible, the things that we have asked them to look at are feasible and can be done and be done in this fashion, then the decision will have to be made, can we proceed forward with it.

Mr. **Brown**. Is CMA prepared to move forward with funding and so forth to complete the study at that point?

Dr. **Karrh**. We are prepared to analyze the recommendations that UAREP makes and at that time decide if we feel that we can provide funding, and if this is within our scope, and if it is appropriate to proceed with it. It may be that it would be in an area that we did not feel that CMA as an organization could proceed with, but it may be something that EPA or HHS or some other governmental organization would want to proceed with.

Mr. **Brown**. Well, there is a similar mechanism funded by the automobile industry, as I understand it, the Health Effects Institute, or something like that. What I am trying to develop in my own mind is whether or not these relatively new institutional mechanisms might provide a vehicle which should be encouraged with offers of governmental assistance or funding or something of the sort as a way to get a more rapid and cooperative approach to determining the scope of the problem. This is what I am trying to understand here.

Dr. **Karrh**. If UAREP came back to us with this feasibility study and with a clear-cut scope of what could be done and recommendations as to how it could be done, we would welcome Government assistance with any further study that was done, whether it was EPA or HHS or any other Governmental agency, because we feel that this is a problem that requires cooperation between industry, Government, academia, and any other interested group.

Mr. **Brown**. Well, it is my off-the-cuff view that it would be in the mutual interests of both Government and industry if a vigorous program could be pursued within a mechanism of this sort. If it is possible for us to give encouragement to it, I would like to be prepared to do so.

Dr. **Karrh**. Thank you.

Mr. **Brown**. Do you have any views on that, Dr. Silbergeld?

Dr. **Silbergeld**. Yes, I do. Thank you, sir.

I am in the position of having been contacted by this university consortium to be one of their consultants on the CMA project, which I hope does not dismay CMA, and also, having just met with the director of the Health Effects Institute prior to coming to these hearings, so I am somewhat well versed currently in the mechanisms of such undertakings.

I have a concern about them. No. 1, I think that many of these efforts are what EPA should be doing. The reason why they are being done by other organizations—and I applaud the efforts of CMA in this instance—is because there is a vacuum, and EPA has not been holding these kinds of conferences or bringing together these kinds of experts. As a matter of fact, as you have heard from other witnesses, they have been doing their best to purge themselves of this expertise. I believe the last epidemiologist left EPA 2½ years ago. So, obviously, there is a void and other people must fill it.

I am concerned, however, that in issues of national priority which affect everyone from your constituents to our members, that there should be the broadest consensus and representation in the directions and drawing up of mandates, as well as in the participation on expert groups and the working committees. Frequently, as I am sure you know, in the second phase, an expert group works with the policy mandate that has been given to them to work with, and they are not allowed the change the mandate really significantly.

Therefore, while I have no criticism of and am anxious to participate in the activities of organizations such as the Universities Associated and the Health Effects Institute and, indeed, have made it my job to do that, I regret that the Federal agency which is most concerned with the product of such deliberations has so abdicated its active role that other organizations feel incumbent to do this.

Mr. **Brown**. Would your views be altered if the EPA or an appropriate group of Federal agencies—and it might be, say, under the aegis of something like the toxicology program—were to provide leadership and were to have the resources which they had within recent years—that is, the EPA had something like $100 million for extramural contract support.

But we could restore that leadership role and the necessary resources to work in cooperation with these institutions, do you think that would be a viable mechanism for achieving the public purposes here?

Dr. SILBERGELD. I think that a heterogeneity of mechanisms—pluralism, if you will—always works best in this country. But it is essential that the research support network that EPA once had be maintained. For at the very least, if it is not, then institutions such as the Chemical Industry's Institute of Toxicology or the Health Effects Institute will have no trained personnel to draw upon in the near future.

We have to have this bedrock of Federal support for research which is directed toward national needs, in this case of the Environmental Protection Agency. I think universities in the past served this function well. I think that was the intent of setting up the centers of excellence under the EPA's extramural research budget, and I would hate to see these centers die, as they are dying.

Mr. BROWN. Dr. Karrh?

Dr. KARRH. Mr. Brown, if I could just address that for a moment, I was a little concerned when Dr. Silbergeld, in her testimony—and I may have misunderstood her, and if so, I apologize—stated that she thought EPA should have in-house expertise analogous to CDC or the Centers for Disease Control.

We agree that that type of expertise needs to be brought to bear on the problem—epidemiology, environmental epidemiology—but we think it already exists in CDC. We would not want to see it reduplicated in another agency, particularly when EPA and CDC should be working together as mandated by Superfund under 104[I]. EPA would be the lead agency as far as the mandate on the environmental side, but CDC would be the lead agency on the health side. I would not want to see us create another research effort within EPA that would be directed toward the health effects when we already have that existing.

Dr. SILBERGELD. If I could correct that, that was a mistaken impression. I did not mean that.

What I meant was analogous in the same way that CDC has built up a world-famous, and probably without peer, response system to incidents of infectious and other disease. I would suggest for your consideration in your discussions that you consider giving to the Agency something it never has had before, and that is the capacity to respond so that it can immediately, and without question as to its veracity and abilities, perform environmental analyses and determine chemicals so we don't have the fiasco of Love Canal and near-fiasco which occurred in Missouri.

Mr. SCHEUER. Excuse me. Just a question. When you say to give to the Agency, do you mean EPA or CDC?

Dr. SILBERGELD. I mean EPA and its national laboratories.

Mr. BROWN. Your criticisms of EPA, from my experience, were well taken. I recall when we tried to make a rather indepth analysis of the quality of their work about 10 years ago on the so-called Chess study, which was, in my opinion, a somewhat simpler problem, we found the quality of the research work and the data collection to be extremely poor.

It has seemed to me that that quality has been improving during the ensuing years, but I suspect I should qualify that by adding that over the last couple of years it has probably deteriorated again.

I very much appreciate the contribution of these two witnesses, and I think the subcommittee could do well to pay heed to their recommendations, Mr. Chairman.

I have no further questions.

Mr. **Scheuer**. Thank you.

Congresswoman Schneider?

Mrs. **Schneider**. Thank you.

I apologize to the panelists, but I had another meeting that I had to attend to out in the hall, but I will take the opportunity to review your testimony.

One of the things, however, that was mentioned, Dr. Karrh, in your testimony is that CMA is committed to cooperative efforts in order to study the problem of environmental pollution and hazardous waste. I am anxious to know what level of commitment are you willing to make, and let us talk specific, tangible things. How about financial resources?

Dr. **Karrh**. I am not in a position where I can commit CMA's finances. All I can tell you is that the industry is very concerned about the perception of the problem that exists. We feel that the cleanup effort of cleaning up the priority hazardous waste sites, and particularly those that are creating or are likely to create a health hazard should proceed.

We feel that there is time, though, to do good, valid studies, and that we should get on with these studies. CMA is sufficiently committed to this that we have joined in the lawsuit with the Environmental Defense Fund, and we have contracted with UAREP on the health studies, and I am sure that we would certainly consider any financial commitment that may be presented to us.

However, we still feel that since Superfund was passed, and it is industry dollars that are going into Superfund, that these dollars should be spent for the cleanup effort and for the health effects studies on the existing sites. The money already exists in the Government mechanism that has been put in through the industry, and this is the appropriate financial mechanism for financing the studies that need to be done and the cleanup that needs to be done at this time.

Mrs. **Schneider**. Well, that is interesting. It was my understanding that the bulk of the money in the Superfund was being used for cleanup, or at least, given the amount of cleanup that is required to be done, we are going to have to use most of it for cleanup as opposed to studies for future mitigation of the problem. Is that a problem?

Dr. **Karrh**. It is my understanding that the funds in Superfund are principally for those sites that are not identified with any particular company or entity that created the disposal site; that these funds are principally for cleanup. But the health effects studies that CDC is to do under section 104(I) of Superfund can be funded out of the Superfund money.

Mrs. **Schneider**. All right. But I think that would be a secondary priority, I would think, for expenditure, health effects.

Dr. **Karrh**. I am not sure I understand why you would think that.

Mrs. **Schneider**. Because, just in dealing with the problem of hazardous wastes in my own district, there is immediate comfort to the community when they see the hauling out of drums and barrels and the actual physical cleanup. I think that there is no assurance that any cleanup is taking place unless they see that change first.

Second, they are anxious to know that one body or another will be conducting a health effects study.

Dr. **Karrh**. I am sorry, I misunderstood you. You meant the health effects for the secondary part and the cleanup as the primary?

Mrs. **Schneider**. Yes.

Dr. **Karrh**. And we agree with that, that the cleanup should proceed, but at the same time, in those areas where health effects studies are needed, they should be started.

Mrs. **Schneider**. All right.

Do you happen to know if there are any individual companies that are part of your membership that are currently involved in assisting with the financing of any studies on hazardous waste, independent industry studies that are taking place?

Dr. **Karrh**. You are talking about health effects studies?

Mrs. **Schneider**. Yes.

Dr. **Karrh**. I am not aware of any individual company that is doing a health effects study around a particular disposal study, but the UAREP study that we talked about is an industry-sponsored study to try to decide how other studies can be done, and that is funded totally by industry, not by any particular company but by the industry association.

As I mentioned in my testimony, the two studies that have been done, both were funded by either State funds or Federal funds or both.

Mrs. **Schneider**. All right. I don't have any further questions, but since I just arrived, if there might be something that either one of you might like to tell me, I am willing to listen.

Yes, Dr. Silbergeld?

Dr. **Silbergeld**. I would like to make a comment which I think is part of what Dr. Karrh was saying, too. I think, certainly, as scientists concerned with human health, we are uncomfortable in putting a lower priority or in some way making health and its investigation compete with other concerns.

I think that if Congress recognizes that Superfund needs augmentation, that should be what you consider, rather than constraints on budget. We have heard for 2 years that no site can be cleaned up because we must have fund-balancing provisions and cost effectiveness. That scenario can be played to death, and it indeed has been, I hope.

But, on a more basic level, I feel very strongly as a toxicologist that health effects studies under Superfund and, indeed, under the mission of EPA, are of paramount importance, because it is on the basis of these studies that we even define what is a hazardous waste and what is a dump site that requires our attention.

If we did not know that benzene, toluene, lead, and dioxin were toxic, we would not move to clean them up. Moreover, it will be on the basis of health effects studies and experimental and clinical toxicology that the EPA will finally determine what extent of cleanup is justified at specific sites. It may in many cases go far beyond the visual measures of hauling out drums, which may be only superficially, and very dangerously, reassuring to persons who live near those sites.

Mrs. **Schneider**. Well, I thank you for that comment.

There is one thing that I would like clarification on, perhaps, from the staff. Tony, the budget that we have here before us for health effects in EPA's research and development budget, is this research into health effects over and above the $6 million that comes out of the Superfund for health effects R&D?

Mr. **Clark**. That is referring to the amount.

Mrs. **Schneider**. It is all lumped together. So that is really peanuts when we are talking about numbers of dollars being spent on the health effects.

Yes?

Dr. **Silbergeld**. If I could, just to give you some perspective. For the study in Times Beach, which is a rather small community, which encompassed a limited number of indicators which were examined, and which does not provide for long-term maintenance of a registry on the persons that are exposed, the CDC has spent close to half a million dollars. So that will give you an idea of how that number you have just quoted fits in terms of the actual needs presented at this moment. I think we should keep that in mind for perspective.

Mrs. **Schneider**. Terrific. Thank you.

Dr. Karrh?

Dr. **Karrh**. Just to add another perspective to that, though, Mrs. Schneider, the half million dollars also includes more than just the 112 people that were studied. That includes dermatological followup studies on an additional 150 people and also a questionnaire of 2,000 people that are in the community which forms the basis for a Times Beach registry of persons.

So, for the half million dollars, the health effects will have been reasonably well studied, or at least the foundation laid so that future studies can be conducted.

Mrs. **Schneider**. You don't agree with that?

Dr. **Silbergeld**. I think the major issue, as Dr. Karrh knows, with substances like dioxin, from the industry studies in this area, is equally divided. Again, I don't want to downgrade any side.

Obviously, one needs to understand what current conditions are and set baseline parameters in the population. But the critical issue is going to be the long-term followup and maintenance of a registry.

I have had conversations with the Director of the Center for Environmental Health. They are extremely concerned about the long-term commitment of this Government toward the maintenance of any health data, and not solely for Superfund purposes.

Mrs. **Schneider**. I have no further questions, and I thank you very much for your testimony. I found this whole hearing very enlightening.

Thank you, Mr. Chairman.

Mr. **Scheuer**. Thank you.

A question for you both. On March 17, representatives from the EPA testified before this subcommittee that chronic epidemiological health studies were of little benefit and that the Agency would not fund such studies.

I would like to hear your reactions to this statement and any views you may have as to the benefits, if any, that flow from chronic epidemiological research. What do they tell us? Is it important for us to know what they tell us?

Dr. Karrh?

Dr. **Karrh**. I would have to know a little more of the context in which they said that. But, taking it on its face, chronic epidemiologic studies, or epidemiologic studies for chronic diseases, are very valuable tools. The unfortunate thing is they are always after-the-fact type studies. The illness or whatever you are looking for will have already occurred before you can study it or before you can detect that it is there.

But they are very helpful in determining the extent of the problem and in determining what additional action needs to be taken for the future to protect people at other sites or in other situations.

So I think the studies are valuable. They are difficult to do with a general population because you have to identify the people who may have been at risk and then identify any health problems they had, and they do require special expertise and considerable follow-up, as Dr. Silbergeld said, according to the dioxin registry in the Times Beach area. But I think they are valuable studies.

Dr. **Silbergeld**. I would agree. I think only an agency that had divorced itself from the field of epidemiology could make such a statement. It goes against everything that industry, academia, and international medical organizations have been doing and recommending for the last century. It goes against all the tools that we have used to detect most of the significant chemical and drug-induced disabilities in human populations.

I am uncertain as to whether they mean to dismiss the epidemiology of chronic disease or long-term epidemiologic studies of any disease.

I would also like to amplify Dr. Karrh's remarks by saying I think one of the reasons, as a scientist, that I am very concerned and interested in the opportunity which Superfund, through congressional wisdom, allows us to bring to the area of health research is the opportunity, unfortunately, of doing prospective chronic epidemiology.

We have before us now, for better or for worse, fairly significant numbers of our population who have been exposed in discrete incidents to very serious chemicals to a lesser or greater extent. In some cases, this exposure can only be inferred, but in other cases, such as Triana, Ala., it may be possible to directly measure it in the people.

We will have these people with us for the rest of their lives. We have an obligation, having allowed this exposure to take place, to at least understand, quantify, and take steps, where appropriate, to prevent its future occurrence.

Dr. **Karrh**. Mr. Scheuer, if I could, I would like to make one other comment on it. I apologize; I should have made it earlier. That is that EPA does not have the expertise in-house to do chronic epidemiology studies, nor do I think they should have. But CDC does have, and has very capable epidemiologic expertise, and with

CDC's role under Superfund, they can very well carry out these studies appropriately.

Mr. SCHEUER. Dr. Karrh, you stated in your written statement that there are no observed significant health problems associated with the disposal of industrial waste. If that statement is true—and I am sure you believe it—wouldn't that make Dr. Silbergeld's concern rather theoretical and unjustified? Maybe we up here are concerned with little or no justification.

Are you saying that there are no hazardous health effects that can be analyzed or evaluated now or that will become apparent in a decade or two from people who are currently exposed to hazardous waste?

Dr. KARRH. No, Congressman Scheuer. That is not what I am saying. What I am saying is that we, in our study of the data that were available, or that are available, we were unable to find any health effects that had been due to waste disposal sites or waste disposal practices that exist now. That does not mean that we should not continue to look for these, that we should not clean up those sites that are in need of clean-up and do health studies where these health studies are needed.

I am just saying that we have not found health effects. In the two studies that I mentioned that were done, there were no health effects found. Dr. Silbergeld mentioned the 112 people at Times Beach having abnormal liver function tests. I have not seen any scientific data on this. I have seen newspaper accounts. I am a physician. I cannot draw conclusions on someone's health from a newspaper account. If you do enough liver function test studies, you will get some abnormal tests in there.

I think what I would prefer to do is see the scientific study before I decide if in fact these people do have any adverse health effects from these exposures.

The other thing is that just because they were in Times Beach and have abnormal liver function tests does not mean that these abnormal liver function tests were caused by the dioxin in Times Beach. The fact that the dioxin was in Times Beach, they were in Times Beach, and they have abnormal function tests does not prove cause and effect.

Mr. SCHEUER. You further went on to state that these epidemiological studies of workers exposed to chemicals in the workplace demonstrate that chemical industry workers have a lower incidence of cancer and deaths from all diseases than the general public.

Now, if words mean what they are generally perceived to mean, this means that either all these so-called toxic chemicals are benign, or perhaps they are good for us if chemical industry workers have a lower incidence of cancer and deaths from all disease than the general public.

Your testimony was excellent. You indicate a very forthcoming and constructive attitude. But you do have some positive statements here that, to me, as a nonscientist, if you take them at their face value, then the concern that a lot of people have evidenced and that Dr. Silbergeld has evidenced is quite unjustifiable. Are we all hysterical over nothing?

Dr. Karrh. Congressman, I would not accuse you of being hysterical.

No, I think you are reading more into the testimony than what is in there. The point I was trying to make with that is that we have people who have been working in the chemical industry for an entire lifetime, and we have studied large groups of these people, and we find that their incidence of deaths from cancer or deaths from other causes is much less than the general population's deaths from the same types of causes, which indicates that our practices within the industry of protecting people and preventing their exposure to these hazardous materials have been quite successful in preventing them from suffering adverse health effects.

I do not think you can extrapolate that to say that exposure to chemicals is good for you. I think what it says is that our practices have been adequate, that we have not harmed people with our practices inside the workplace, and we think that, based upon those data and based upon the data we have from the disposal sites at this time, we can extrapolate that and draw inferences that indicate that, at the present time, there is not a big problem from waste disposal sites out in the communities, as the public perceives there is, which gives us some comfort that we have time to do appropriate studies and to clean up the disposal sites before we do have a problem.

Mr. Scheuer. Would you like to react to that, Dr. Silbergeld?

Dr. Silbergeld. Well, I think there is a higher authority we can bring into this discussion, and that is the National Institute of Occupational Safety and Health, which has conducted many industry-wide studies. I think they would also be interested to learn that their positive results are spurious.

I also think it is of some concern to have data presented by what must be considered an interested party. This again points to problems with agencies like EPA and their inability to do such studies on their own. I have just learned, for example, that the EPA was prepared in 1979 to do a study of birth defects in Midland, Mich. This was dropped, and the preliminary data which had been collected by one of the last epidemiologists in the agency was turned over to the Dow Chemical Co., presumably for that company to conduct a study of birth defects among its workers.

Similarly, under court order, there has been a reanalysis of the data from the Nitro, W. Va, episode where workers were exposed at a Monsanto plant to dioxin.

These are very serious issues, and it is difficult for both Dr. Karrh and me to discuss them in detail in the setting of a hearing because they do involve intricate technicalities of epidemiologic evidence and validity of studies. But I think it is going too far to say that we have no evidence from either occupational or environmental studies suggesting that there are diseases and adverse health effects associated with such exposure.

I do not wish to be pressed into the semantic trick of claiming the epidemiology ever proves causation. That is not the nature of that science. But I think that the associative demonstrations have been many and are, for most people, sufficient to provide a basis for preventing further such episodes.

Mr. **Scheuer**. Dr. Silbergeld, you mentioned at one point that your own Environment Defense Fund, as well as the OECD, had been evaluating the toxicity of various chemicals. Can you give us the results of OECD's study and perhaps the Environmental Defense Fund's, also?

Ms. **Silbergeld**. The OECD, which is one of the major trading blocs to which this country belongs—and, indeed, we were one of the forces which established it after the second world war—has taken quite seriously the mandate which Congress also attempted to impose upon EPA under the Toxic Substances Control Act. This is to come to grips with means of assessing both new chemicals and existing chemicals for safety.

Now, the EPA has stated that they are it unable to develop such guidelines or methods to provide even a preliminary screening for many disciplines of toxicology. As I mentioned, reproductive toxicology was singled out as an area of mystery for that agency.

I think it is important to note that OECD has not found this an impossible task. Nobody would state that the final word is in on how to assess the toxicity of a compound with complete guarantee of safety or, indeed, complete guarantee of hazard. Science is, of course, probabilistic, and methods are always changing.

But there are methods available. Many of them have been validated, and certainly they are applicable. The development, application, and verification of such methods should be a prime direction of EPA's research and development.

Mr. **Scheuer**. Dr. Karrh, let me address a question to your more or less in a fuzzy way, addressing you as an industry representative.

You know the financial pressures under which we are functioning and the pressure for balanced budgets, and so forth. How do you think we can bring the talent, the creativity, and the scientific expertise that resides in industry in the great chemical companies to bear on the problems of evaluating toxicity, to bear on the many epidemiological studies that we need to undertake, to bear on the whole question of evaluating for the American public and for the chemical companies the question of whether and to what extent dioxin and these other chemicals that have concerned the public are toxic. How do we harness the talent in the private sector in a cooperative effort with Government rather than a confrontation with Government, to give the public some facts and give the public some guidance and help EPA and perhaps some agencies do their jobs more quickly and more cost effectively?

What would be the institutional mechanism for doing that?

Dr. **Karrh**. Mr. Chairman, I think industry has demonstrated through the years that it is capable of bringing its talent to bear on the questions of toxicity of chemical substances and how should we set safe levels, or should we in fact not even produce those chemicals.

For instance, my own company started the Haskell Laboratory for Toxicology and Industrial Medicine in 1935 solely for the purpose of determining the toxicity of the chemicals that Du Pont makes, handles, buys, or sells.

Mr. **Scheuer**. Dr. Karrh, in the last week we have seen an article on the front page of the New York Times that the Dow chemists, with all their expertise, were very much concerned with the possible toxicity of dioxin 18 years ago, in 1965. They were so concerned that they brought their competitors, other chemical companies, into a meeting.

The one thing that they emphasized, in addition to their concern, was that we don't want word of this effort to leak out; otherwise, we would be confronted with all kinds of Government regulation. They certainly were not being forthcoming.

Today, the Dow Chemical Co. is spewing its discharges daily into the Tittabawassee River with unknown quantities of dioxin, and they are refusing EPA access; they are refusing EPA cooperation in determining levels of toxicity.

Now, your company may be different, and it probably is, but as far as the public perception is concerned—and, I would venture to say, my perception, too—the examples that we are reading on the front pages of our great papers do not indicate that public spiritedness or sense of corporate responsibility.

We are trying to change things. We have not observed that confrontation produces very much. We would like to involve the chemical industry executives in some kind of a more constructive process. I don't think we can just say, "Well, the record proves that they are constructive, they are involved, and it has been a cooperative effort." I would venture to say that that statement would confound many of the people who are most concerned about this problem.

I think we have to do things differently than we have done them in the past. The Dow experience is a perfect example of that.

Dr. **Karrh**. I think that is true, Mr. Chairman, but to have a confrontation, it takes two parties. It is unusual that one party could have a confrontation. I think the Government has been less than forthcoming in many ways.

I cannot speak for Dow because I don't know that much about Dow's operations. I do know that Dow determined the toxicity of dioxin just from the newspaper reports. We have learned a lot since 1965 or 1966, whenever it was. We know now that the public wants to know more than they wanted to know then, and we are prepared and equipped, and we have the mechanisms in place, that we can determine the toxicity of chemicals and inform the public. A very prime example——

Mr. **Scheuer**. When you say "we," who is we?

Dr. **Karrh**. We the industry, the chemical industry.

A prime example is the chemical acrylonitrile, which Dow itself, under contract to the Chemical Manufacturers Association, did the animal studies that indicated the acrylonitrile may be a cancer-causing substance in animals.

The Du Pont Co. did an epidemiology study in which they raised a serious suspicion that acrylonitrile may cause cancer in humans. Dow immediately released their data to the public and to the regulatory agencies in 1976 when they discovered this in their laboratory animals. Du Pont released the human data to the public and the regulatory agencies in 1977, as soon as we discovered it.

I think if you continue to judge people today for what they did 15, 10, 30 years ago, when our whole societal structure has changed, then we are going to continue to have the problems that we have now. But I think Government is just as guilty of the confrontation as industry, and both parties need to sit down and reason with each other and do the things that we are talking about in this hearing today that ought to be done, rather than continuing to throw up things that happened 15, 20 years ago.

Mr. **Scheuer**. Well, you know, this is happening today. Dow is refusing to give EPA access to its plant in order to examine the discharges that it is making daily into that river. What the EPA wants is simply knowledge. Now, I do not think that is a confrontational posture. It seems to me, if you took a poll of the American people, it would be about 99.9 to 0.1, if you could find 0.1, that the Government is entitled to know and is entitled to evaluate, and maybe Dow could help the Government evaluate. But Dow is not giving the Government the basic knowledge of the toxic substances that it is discharging every day into the Tittabawassee River.

Now, that is today, at this very moment, 25 minutes to 5. They are refusing to give EPA that information, refusing to let EPA examine that discharge itself.

It was only about a month ago, before a hearing of this subcommittee that I chaired, after persistent bludgeoning, that Dow finally consented to allow EPA scientists to come, to enter its plant, and to test the soil in Midland, Mich., for dioxin toxicity.

Dr. **Karrh**. But you know I am not from Dow, so I cannot really speak to that. The only information I have is from the newspapers.

Mr. **Scheuer**. I understand that. But there is a problem out there, and I don't think it is enough to say that it takes two to tango and the Government has been confrontational, too. The Government is trying to educe basic information, and in the absence of that, the Government is trying to make its own analysis, and they have been refused permission up until a month ago to even enter the Dow plant and, to this day, to examine the daily discharges.

You heard the question, I think. Were you both here when I asked the question to the panel just preceding you? What is wrong with our institutional means of coping with the whole business of the explosion of toxic substances that the genius of American industry has produced over the last probably 50 years?

I will recognize Ms. Silbergeld and then, after that, you, Mr. Karrh.

Let me say, at the end of this quorum call, we have a 5-minute rollcall vote, so I will have to leave here as if I am shot out of a cannon when the two bells come up, but you can continue talking, and I will ask our staff people to close up the hearing when you are finished.

Please proceed, Dr. Silbergeld.

Dr. **Silbergeld**. I have only one comment to make on this, because I have thought about it, also. I think that industry has done some remarkable things. The Chemical Industry's Institute of Toxicology is a prime example of bringing the intelligence and the resources of industry to bear on some real problems, and I think you are being modest not to mention it.

DuPont, Monsanto, Dow, and other chemical companies have contributed mightily to our knowledge. But in terms of restructuring our regulatory institutions, I think one area which may cause problems for EPA is its uniqueness. It attempts to combine research and regulation under one aegis. Other agencies such as those concerned with occupational safety and those concerned with drug regulation have found it better to separate those responsibilities and to provide an advisory role of the research branch to the regulatory branch. This guards against constant interference and vulnerability of one side to the other, with the regulatory aims frequently overriding the ability of the research branch to conduct independent and meaningful research.

I think we have seen a pretty calculated destruction of the research capacity of the agency at the hands of persons who have defined new regulatory goals.

I don't know whether that kind of defined institutional separation needs to be imposed on the agency, but I put it forward for your consideration when you consider a variety of institutional changes which might make it easier for the EPA to fulfill its role.

Dr. **Karrh.** Thank you, Dr. Silbergeld, for at least recognizing the Chemical Industry Institute of Toxicology. I would like to say, as a member of the board of the Chemical Industry Institute of Toxicology, if I were not here this afternoon, I would be in a meeting of the development committee of that organization. But I had to get someone else to go in my place because of this hearing.

I agree with what Dr. Silbergeld said, that there needs to be a better mechanism for working on it, and I think that the chairman has hit upon that himself.

There are several things that need to be done, both from the governmental side and from the industry side. One thing we can start with is to begin to make the atmosphere less adversarial and more conducive, more cooperative between the two, and that rests on both sides, between Government and between industry.

We have a situation where, in the past, we have had the guilty-until-proven-innocent attitude in many cases, and I think that has got to change so that there can be a cooperative effort.

In the meantime, though, we have to keep a perspective on the real issue. The real issue is that, at the present time, we don't have great numbers of people who are being harmed. We have the potential that they could be, and that is the issue that we need to address, so that we don't have people who are being harmed. We need to clean up the waste sites that are posing a problem and may pose a problem, and we need to do appropriate health studies so that we can determine the extent of the problem.

Our feeling is that if a company is doing something wrong, then there are appropriate societal mechanisms, penalties by society, that should be brought to bear on that company to the full extent of the law that will allow it to be brought to bear.

Mr. **Scheuer.** Well, what I am asking is, in the absence of these appropriate societal mechanisms, what do we do? With the present laws that we have, industry is able to appeal and appeal some more and again in dilatory motion practice so that it may take 5 to 10 years for a final result.

Meantime, they are spewing toxic chemicals that may or may not be harmful all over the landscape. In my opinion, society does not have the institutional setup whatsoever to cope with toxic wastes. We have failed.

Dr. KARRH. Congressman, do we know that they are spewing toxic materials, other than the newspaper accounts? Has it been shown that there are toxic materials being spewed and people are being exposed to them, or is that what the newspapers are reporting?

Mr. SCHEUER. Dr. Silbergeld, do you want to answer that question for me? I will give you my proxy.

Dr. SILBERGELD. Thank you.

I don't know if you want to start with the ASARACO smelters in Idaho or in Dallas, or if you want to talk about Fairchild Industries in San Jose, or you want to talk about Stouffer Chemical Co. in Woburn or Dow Chemical Co. in Midland or General Electric on the Hudson or a cadmium battery plant in Montreal. I leave it up to you as to where you would like examples to be drawn, but in all of those, I can point you to the scientific literature where studies have been published showing adverse health effects in resident populations.

Dr. KARRH. I would like to see those, but we did not find them in our survey of the literature, so if you would send them to me, I would appreciate it.

Dr. SILBERGELD. I would be very happy to do so, sir, and I would be happy to provide them for the committee.

Mr. SCHEUER. Please do.

[The material follows:]

ENVIRONMENTAL DEFENSE FUND

29 June 1983

Anthony Clark
US House of Representatives
House Committee on Science &
Technology, Room 817
House Annex No. 1
Washington, DC 20515

Dear Tony:

Enclosed please find my corrected testimony; I was very embarrassed to find it concealed under some miscellaneous papers (such as Dow's propaganda on dioxin!) on my desk today. In addition, the references which I indicated on page 115 are as follows:

Landrigan, P.J., Baker, E., Whitworth, R., and Feldman, R.G. (1979). Neuroepidemiologic evaluation of children with chronic increased lead absorption. In: Needleman, H.L. (ed) LOW LEVEL LEAD EXPOSURE: THE CLINICAL IMPLICATIONS OF CURRENT RESEARCH, New York, Raven Press, 17 -34.

Wolff, M.S. (1983). Occupationally derived chemicals in breast milk. Amer. J. Indust. Med. 4:259-281.

Seagull, E.A.W. (1983). Developmental abilities of children exposed to polybrominated biphenyls (PBB). Amer. J. Public Health 73:281-285.

Pihl, R.O., and Parks, M. (1977). Learning disabilities and hair metals analysis in children. Science 198:204.

Yours sincerely,

Ellen K. Silbergeld

ELLEN K. SILBERGELD, PhD
Chief Toxics Scientist
Toxic Chemicals Program

EKS:jdd
Enclosure

Dr. Silbergeld. I don't think that is really the issue here, and I don't think that is what the Congressman has been asking. I think what he is concerned about is the immediacy of the issue and the institutional ways in which we respond.

Dr. Karrh, again, I think you are being modest in that some very interesting innovations in attempting to resolve differences outside the regulatory structures as they currently are operating has taken place. Your organization and my organization came to a fruitful meeting of minds on the issue of PCB regulation just a couple of weeks ago.

More of that kind of mediation has to take place. Some of the grounds on which that took place, I think, were extremely interesting, where we agreed to disagree on issues relating to basic toxicity of PCB's and then agreed to agree on how to get on with the job at hand.

I think that a spirit of cooperation on both sides is obviously necessary, but equal parties have to meet in order to provide appropriate and effective cooperation. When one party, such as the EPA, has so disarmed itself, or has proved itself so unwilling to behave in a vigorous and responsible manner, then, clearly, very little constructive will come out.

The regulations of toxic substances is terrible. You cited the issue of acrylonitrile and how the industry has presented some of the most compelling evidence on that substance. Are you aware that the Office of Toxic Substances overrode the recommendation of the Interagency Testing Council and decreed that no further information or no action is necessary on acrylonitrile?

Dr. Karrh. No, I am not aware of that, and I am not sure that I see how that pertains to what we were talking about as far as what industry is doing in this area. That was an internal Government thing, if I understand what you said.

Dr. Silbergeld. Well, I was broadening the question. You are right, to a certain extent, because I cannot speak to what you should be doing internally, but I see this as at least a tripartite issue—the public interest concerns, industry concerns, and Agency concerns. I think that the Agency has so weakened itself that it is very difficult to construe an institutional scenario which is realistic or effective.

Mr. Scheuer. All right. This has been a most thoughtful and stimulating panel, and I thank you for your patience and tolerance. We have just gone way beyond where we should have been in terms of time, and it is only because we found your testimony so valuable.

I thank you both.

Dr. Karrh. Thank you.

Mr. Scheuer. I am going to go and answer this rollcall vote. It is a 5-minute vote. I should be back within 10 minutes, and then we will take the last witness.

So we will suspend for about 10 minutes.

[Short recess taken.]

Mr. Scheuer. May we resume.

We will commence the last panel on energy development and environmental problems. We will hear from Dr. Richard Rowberg, program manager of energy programs at the Office of Technology Assessment.

Dr. Rowberg, your testimony will be printed in full at the conclusion of your oral presentation. We will not impose upon you the usual 7- or 8-minute limitation; we will ask you to take such time as you may need. It is the least we can do to reciprocate your patience. I will sit here until you are finished with great pleasure and great anticipation.

Maybe you would start out by introducing your colleagues for the record, and then proceed to take such time as you may need, and then I am sure that we will have some questions for you.

STATEMENT OF DR. RICHARD ROWBERG, ENERGY PROGRAM MANAGER, OFFICE OF TECHNOLOGY ASSESSMENT, ACCOMPANIED BY ROBERT FRIEDMAN, SENIOR ANALYST; AND STEVE PLOTKIN, SENIOR ANALYST

Dr. ROWBERG. Thank you, Mr. Chairman.

With me are Steve Plotkin on my right and Bob Friedman on my left, both of whom are project directors at the OTA and who have been responsible and involved in much of the environmental work that the agency has carried out for the last couple of years.

The purpose of my testimony, which I will briefly summarize, is to review the current state of energy in this country, to discuss some general characteristics about that energy future, and to point out some environmental consequences about it.

In 1982, the U.S. energy use was down about 4.3 percent from 1981 and down from the peak year of 1979. At the same time, net oil imports had dropped by nearly 60 percent from their 1977 peak.

These trends were a result of a very large conservation effort and an increase in our domestic energy production.

Mr. SCHEUER. Would it also be partially the result of decreased industrial activity resulting from a recession?

Dr. ROWBERG. Yes, there was a great deal of that. I think, to the extent that we have been able to separate it out, though, more than 50 percent of the conservation effort was real conservation.

Mr. SCHEUER. More than 50 percent of the reduction in energy use?

Dr. ROWBERG. Yes.

But there are several aspects about the trend, though, that give cause for concern if you look at it in some detail.

First of all, conservation has been substantial, and as you indicated, some of that has been due to the economic decline, but a lot of it has been due to honest increases in efficiency.

There is much more that is needed. There are reasons to believe, however, that the conservation efforts will be insufficient. There is a large unfilled potential in all sectors—buildings, transportation and industry—which, even with the current decline in oil prices, has a very high economic return.

Nevertheless, a large fraction of this potential improvement is not likely to come about because of poor capital markets, insufficient financial incentives, and inadequate technical data.

Mr. SCHEUER. Do you mean inadequate technical data to prove the technology?

Dr. ROWBERG. That is partially it, in the sense that the data for conservations options, particularly in buildings and homes, exist, but the transfer of that data to people who can make the investment has been insufficient in many cases. We have found many examples, again in the buildings area, where investments which could reduce energy use and pay back in less than 3 years are just not being made. Owners are either not aware of them, or, if they are aware, there is still enough uncertainty in the payback and the actual savings for them to go ahead and make the investment. This is largely due to the fact that some of these technologies have not been proven sufficiently so that the investment is reliable.

In the other areas, particularly in automobiles and industry, there is less uncertainty about the technical data, but there are still many opportunities that we have uncovered in doing studies on industrial use and automobile fuel efficiency that are not being taken that could be to accelerate the increase in efficiency.

In the domestic energy production, there are also some weaknesses that are appearing. Over the last 7 years, most of our increase in domestic energy production has been the result of an expansion of coal production. Oil and natural gas production have stopped declining in the last few years, but they have not increased, either.

But the Nation appears, however, to have reached a halt, at least temporarily, in their switch to coal from oil and natural gas. We also do not expect the oil and natural gas production to increase, but rather it will likely continue its long-term downward trend.

So these production and conservation considerations mean that we will very likely be importing a substantial amount of oil by the end of the century. In an analysis we did for our report on synthetic fuels, we found that even in the extreme case, where we could reach the technical limits for automobile fuel efficiency, and that if conservation and fuel switching were so effective that we could eliminate all the uses of oil by stationary users such as boilers and process heaters and home heaters, we would still be importing nearly 4 million barrels a day by the end of the century. At that time that value would be over 40 percent of all of our oil consumption.

The primary reason for that substantial import level is the decline in domestic production which would continue for the rest of the century.

Without any new, significant supply technologies, then, to replace oil, we face the prospect of continued high dependence on imported oil, even under these rather extreme conditions of fuel efficiency.

What are the other technologies that we can consider?

Well, first of all, there is——

Mr. SCHEUER. Excuse me. Can I ask you why domestic production is going to continue to decline for the rest of the century?

Dr. ROWBERG. Well, primarily because we are not discovering oil fast enough to replace the decline in the old fields. We have had, in the last couple of years, a substantial acceleration of domestic exploration and domestic drilling, which has maintained our production level at the same level as in 1979, about 10 million barrels per day of liquids.

But the discovery of the large fields that are needed to increase the production base are just not occurring. What we are discovering are smaller fields, and these are smaller fields that had been previously uneconomic that are now becoming economic. But it is just enough so far to just to stay in place.

Mr. SCHEUER. Is it that as oil goes below $30 a barrel—$29, $28, as we are doing now—the development efforts that would be economic if you could get $35 or $40 a barrel for the oil now become uneconomic when oil is priced at $29 a barrel?

Dr. ROWBERG. That has something to do with it, but the basic effect is that the large resources that are needed to keep the production levels up are not there any more at any price. So what is happening with the higher price is that it allows us to produce marginal fields and smaller fields, but that only buys a short amount of time. In order to continue high production levels, you have to continually expand the resource base in order to keep up the ability to produce oil at a certain rate up.

Mr. SCHEUER. When you say resource base, do you mean capital?

Dr. ROWBERG. No, the actual resource of hydrocarbons in the ground.

Mr. SCHEUER. Oh, I see, yes.

Now, let me ask, we have read that there are large, undeveloped fields of oil, petroleum in Mexico, in Canada, in Venezuela or offshore Venezuela, offshore Argentina—western hemisphere sources of oil that would not be vulnerable to a blockade or a stoppage, an embargo by Persian Gulf oil interests.

Would it pay us to offer these countries lifting agreements, long-term contracts to bring that oil to the surface and put it on barges at $30 or $31 or $32 or $29 a barrel? Should we be trying to help these countries that are capital-short, including Canada, develop their oil and bring it to the surface to meet our market?

Dr. ROWBERG. There may be a number of reasons why it might be useful to help these countries produce that resource. In the current state that the oil market is in in the world today, and which it is likely to be in for the next few years, that is not likely to be too helpful. The price of producing that oil, particularly oil like the Venezuelan heavy crude, which requires a substantial amount of processing—much more processing than the Middle Eastern oil—is likely to be to high to be marketed.

Over the long term, I think it would pay to provide whatever might be reasonable incentives and assistance to help develop those resources for those countries, if nothing more than to stabilize their economies.

If we decide and choose to maintain a substantial dependence on imported oil, certainly diversity of markets would be better. Making a wide selection of where we get our oil would be better.

Obviously, over the next several years, those countries, if they are able to expand economically, will be using a greater portion of their own oil, particularly Mexico.

So it is not clear, even though there are major resources there, that they would be available to a great extent to be able to provide us with as much oil as we needed if we chose to go the import route.

The two technologies that I wanted to talk about in terms of substitution of oil were direct use of coal for producing electricity or for substitution of oil by synfuels.

Both of these have difficulties, though, in terms of their ability to substitute for oil use over the next 20 years. For example, with the question of direct substitution of electricity—and it is fairly simple to burn coal to produce electricity; it is the primary fuel to produce electricity right now—the technologies for using electricity in place of direct combustion of oil are either very costly to operate or are still under development or require substantial time and capital for installation. So the substitution potential is somewhat limited over the next several years.

For direct use of coal for process heat or for boilers in industry, problems exist there as well. We have not seen very much conversion over the last 10 years, even though there is a very distinct financial advantage to do so in terms of the relative prices of coal and oil. The primary reasons are lack of capital, coal storage and delivery constraints, and, to some degree, the uncertainty about many of the environmental difficulties that accompany the burning of coal.

As far as substitution for oil and gas by synthetic fuels which would be produced from coal or oil shale or for biomass, we also find some difficulties there. In our study on synfuels, we found that a sizable synfuels industry would be required if the United States were to eliminate or to reduce to rather insignificant levels oil imports by the first decade of the next century.

But the uncertainty about the future price of oil, the high technological risk of the first round of plants, and, to some extent, environmental concerns have all contributed to a reluctance on the part of potential investors to begin major synfuels projects.

Mr. **Scheuer**. I visited the SASOL plant in South Africa that has been operational for about 30 years. They don't seem to have any environment problems there that they know of. You could see flowers and gardens blooming within 100 yards of the plant.

Also, the technology seems to be pretty well tested. I don't understand what uncertainties there should be.

Dr. **Rowberg**. Well, the SASOL technology is what is called a first generation technology. It uses the Lurgi gasifiers, and the gasified coal is used to produce liquids.

That certainly could be used in this country in some areas because it is somewhat dependent on the type of coal.

The cost of producing those liquids and gases from that process is very expensive and would not be able to be marketed in this country at the current price of oil.

Mr. **Scheuer**. At what price per barrel oil equivalent does the synfuels technology become economical?

Dr. **Rowberg**. We spent a great deal of time trying to figure that one out in our study. We did estimate some levels of production costs for synthetic fuels. The cheapest fuels that we could determine would be oil from oil shale and methanol from coal, both of which were selling for prices on the order of $5 to $10 a barrel more than the current price of oil.

We did not find any evidence that that differential would always exist, but there is a certain relationship between the price of oil and the price of synfuels such that there would likely be a differential, at least at the beginning of the plant construction, because the plants are so capital-intensive. After a certain amount of time, if the price of conventional oil continued to increase, the cost curves would cross.

So it is not that far away. As a matter of fact, the way oil prices were going a few years ago, a lot of people in the industry felt that it would be reasonable to expect that that cost curve crossover would occur in this decade. And so there was a lot of activity and a lot of investment—at least startup—in the synthetic fuel plants, particularly in oil shale. That has all gone by the boards now, however, because of the softness in the oil market. Nobody is quite sure how long it is going to last, but it is going to last long enough to keep a lot of the major investors from going into this business.

Mr. SCHEUER. On the other hand, I take it you are saying that you can produce energy through synfuels at an energy equivalent of $35, roughly, per barrel for oil?

Dr. ROWBERG. I think the lower levels of that would approach the order of $35 to $40 a barrel for the oil shale and for the methanol. The higher ones went up as high as $60 and $70 a barrel.

Mr. SCHEUER. Well, at $60 and $70, it might be sort of a dubious, marginal investment. But I would think, at $35 to $40, over the long pull, if we could assure ourselves 10, 20, 30 years from now energy at an energy equivalent level of $35 to $40 per barrel for oil, I would think that would be an excellent long-term sort of line of defense. That would be an excellent defensive posture.

Mr. ROWBERG. Well, the prices at that lower end were attractive. I am going to have to doublecheck for sure those lower end prices. They may have been closer to $40 than $35. But even at $40——

Mr. SCHEUER. Even $40.

Dr. ROWBERG [continuing]. They still would have appeared to be attractive. So, as I said, there was a lot of interest, when oil prices were at $35 a barrel. A $40 or even $45 a barrel synthetic fuel plant which, once it was producing at that level, would produce oil at that price for the life of the plant.

But now that oil is dropping and is approximately $25 a barrel that is no longer the case. Particularly in a situation where we are still in an economic malaise and are reluctant to make such long-term investments when the risk appears to be growing because of this differential. The difference between $25 and $45 is a lot greater in the eyes of these investors than $35 to $45 was.

So, you are right. The stability that would be offered by the synfuels price, plus the gap that appeared at the time in 1979 and 1980, did make it a rather attractive investment, or a potentially attractive investment. But not so today, unfortunately, and that is one of the main reasons why what I am trying to argue is that we are likely to be in serious trouble by the end of the century as far as oil imports, should we choose to not do anything about it between now and then.

Well, I mentioned a number of problems. What I would like to do is sort of highlight some of the environmental problems that we came across in our analyses of synfuels as well as the analyses that Bob Friedman directed on acid rain, both of which, of course, affect these potential substitutes for oil quite a lot.

In terms of synfuels, the production of large quantities of synthetic fuels carries a significant risk of adverse environmental and occupational health effects, some of which are quite dependent on the effectiveness of as-yet-unproven control measures.

In addition to effects which are similar to the direct combustion of coal, synfuels development also creates a potential for occupational, ecological, and public health damage from the escape of toxic substances formed during the conversion process.

Despite substantial industry efforts to minimize adverse effects, the environmental risk associated with the toxic substances generated by synfuel production are significant and warrant careful attention.

Detecting synfuels' environmental damages and tracing them to their sources, which is a key requirement in establishing and enforcing control standards, may be difficult because many of the damages will occur slowly, and the relationship between cause and effect is complex.

In the area of direct coal combustion, one of the biggest potential concerns is acid rain. Due to the scientific uncertainty surrounding the extent and magnitude of the risks from acid rain, environmental policy decisions that affect the attractiveness of converting to coal have not yet been made.

For example, we feel that the scientific evidence strongly supports the conclusion that there are adverse effects of acid deposition on aquatic ecosystems. However, the extent of the effects—in other words, the number of lakes and miles of streams affected—is difficult to quantify.

In addition, forest productivity declines and tree death have been observed in parts of New York, Vermont, New Jersey, and West Germany.

Mr. **Scheuer**. And Canada. Their forest products industry is being decimated. It is about 17 or 18 percent of Canada's GNP, and they are absolutely outraged at the effect of acid rain, most of which is created from the Ohio River basin and elsewhere, on their forest products industry in eastern Canada.

Mr. **Friedman**. I think they are very concerned about it, certainly. I don't know of too many Canadian foresters who would point to damage right now, but without question, they are very concerned about the loss of some of that resource.

Mr. **Scheuer**. Let me ask this. The Japanese are not building any smokestack industries now that do not include scrubbers, the state-of-the-art technology.

If we went to the state of the art in all new scrubbers and gave some kind of tax credit to encourage conversion over a 10-year period or even forced state-of-the-art cleaning devices, like scrubbers, on the industry, wouldn't that solve much if not most of the acid precipitation problem? Don't we know how to prevent acid precipitation if we are willing to make the capital expenditure to do it?

Mr. **Friedman**. I think that is true. I feel quite confident that we can reduce acid deposition if we are willing to make the capital expenditures to reduce it from levels that we have today. The costs are substantial, however. We estimate reductions on the order of 8 million to 10 million tons of sulfur dioxide per year, a 35- to 45-

percent reduction in the East, would cost on the order of $2 to $5 billion per year. That is not a complete technology approach, but using lower sulfur coals in combination with scrubbers, whenever each particular control method is most cost effective.

It is a political decision as to whether that level of investment is a wise societal move.

Mr. **Scheuer**. You are telling me the buck stops here.

Mr. **Friedman**. Yes.

Mr. **Scheuer**. We are spending, I am told, about $3,000 per man, woman, and child in the United States to produce energy. Is that a reasonable figure?

Dr. **Rowberg**. It is an awful lot of money. I would say that that is reasonably close.

Mr. **Scheuer**. If you have a different figure, maybe you could check.

Dr. **Rowberg**. I will check for sure.

Mr. **Scheuer**. I am told that we are spending $3,000 to produce and consume energy, and we are spending approximately 10 cents a year per capita on research into acid rain.

Now, there must be a reasonable figure per capita that it would make sense for our industry. Consumers are spending $3,000 to consume the energy. There must be some reasonable fraction of that that, by any economic criteria, it would be reasonable to expend, One, on research to devise the systems for controlling acid deposition; and, Two, on capital investment to control acid deposition.

Could you come back and give this committee the annual expenditure per capita for energy production and consumption, the total that we are now spending on research to effectuate coal conversion in an environmentally benign way, and then give us some estimate of what a reasonable and prudent society—do you know the "prudent man" rule in law? Are there any lawyers up there? Well, freshman law students learn about the prudent man rule. It is obvious. It is self-explanatory: what a prudent man would do in the conduct of his own affairs.

What would a prudent society do in the conduct of its own affairs. Given the per capita expenditure—if it is not $3,000, tell me what it is—tell me what a prudent society would do to enhance and protect its own future.

Let's take arguendo $3,000 per capita cost of producing and consuming energy. What would a reasonable figure be for research and development and for capital equipment—installation of capital systems, devices, cleaners, scrubbers, what have you—to make that conversion to coal, of which we have a 500-year supply under the earth there. We are blessed by the Almighty with a virtually unlimited supply of coal.

What would prudent program of research and capital investment be in relationship to what we are spending in terms of production and consumption of energy?

Dr. **Rowberg**. We can give you the estimate the cost of energy consumption per person. That will not be any problem. We will also try to break it down so that you can see which portion of that goes for energy produced by coal, which is, as I said, primarily electricity. It would be considerably less but still a large amount.

We have, as Bob indicated, some estimates of the cost of reducing the production of sulfur from coal, and we also know the R&D expenditures that are currently being made.

Mr. **Scheuer**. Let us say that if we were to put a tax on energy consumption, let's say on electric consumption, sufficient to pay for research and development and capital equipment over, let us say, a 20- or 30-year period, a tax as a percentage of energy consumption, of what people pay for energy, what would that tax be? Would it be 1, 2, 3 percent? Would it be 50 percent? If it were 50 percent, under the prudent society rule that we have just developed here together, that might be a little bit much. But if it is 1 or 2 or 3 percent, then, under the prudent society rule that we have developed together here this afternoon, that might be a pretty sound societal investment.

Now, you critique this prudent society rule that we have developed together. Does it make sense to you?

Dr. **Rowberg**. Well, the major problem with it is determining what happens, what the effects are.

As we have seen today from many of the discussions on these questions, there is a great deal of disagreement as to what the effects are.

In the study that Bob did, they probably took as comprehensive a look as possible at what the potential problems were. We can certainly give you an estimate of what it would cost to reduce sulfur emissions. In fact, Bob can give you that probably right now.

Now, the question of prudency is one that obviously has to be decided, as Bob mentioned earlier, by the legislative and——

Mr. **Scheuer**. Yes, but we have to have some intellectual fun.

Dr. **Rowberg**. Right. We can give you that cost so that you can make a judgment.

Mr. **Scheuer**. Let me just react to something you just said. My understanding is that there is not very much difference of opinion on effects. We know the effects on flowers, on tree production. We know the effects on streams and lakes. If you want some visible proof, come and visit the Adirondack lakes, which are in my State, and we will show you that half of the Adirondack lakes are incapable of sustaining fish life.

We know the results on crop lands. We know the results on grasslands. We know the results on structures, the eroding of physical structures, stone and concrete structures.

What we have not proved sufficiently is the linear relationship between a given reduction in pollution in the Ohio River valley and polluting effects on my home in Duchess County or upstate New York or Canada. We cannot show with 100 percent linearity or 100 percent cause and effect that a reduction of 10 percent in pollution here will produce an 8 or 10 or 12 percent reduction in pollution 500 or 1,000 miles away.

But, in general, don't we have a pretty good idea of the polluting effects of acid precipitation?

Mr. **Friedman**. I think where the controversy begins is the extent of the damages. We know that there are lakes that are altered. There is controversy as to how extensive that alteration is now, and how extensive it may be in the future.

We have estimated that approximately 20 percent of the lakes in about 25 percent of the land area are currently extremely sensitive to the effects of acid deposition or already acidified.

Mr. **Scheuer**. The largest freshwater lake in the world, Lake Michigan, is already severely contaminated, is it now? Not so much, perhaps, by acid precipitation as it is by chemical wastes, I suppose.

Mr. **Friedman**. Yes. I think there are certainly water pollution problems within Lake Michigan, but not from acid deposition.

Effects from acid deposition are of greatest concern in smaller lakes, several-acres in size, and in small streams, often ignored, which are prime fisheries and a prime resource.

As far as damage to forests, we know that somewhere there are some trees that are hurt, that there are soils that will be altered by acid deposition. But there is great uncertainty within the scientific community whether this can be considered one of the serious effects of acid deposition.

With regard to crops, there is one study on one strain of a particular crop that conclusively shows damage from acid deposition, but we don't know how generalizable this is to other crops.

I think, within the scientific community, people are coming to consensus about one of the most contentious issues. That is, if one reduces sulfur dioxide emissions by, say, 25 percent or 35 percent, could one expect reductions in depositions of equivalent amounts?

Some research over the past year has, I think, moved the scientific community to settling this question. We know it is not exactly one to one, but we know that if we reduce emissions, a very large fraction of that emissions reduction will be removed from deposition.

I think the controversy settles on the extent of the problem, on the resource effects.

Mr. **Scheuer**. Could you give us some rough figures of the kind that I have suggested? How much are we spending per capita?

Dr. **Rowberg**. I think we can provide that.

Mr. **Scheuer**. And what percentage of that would be a prudent amount to spend for research and development and for capital equipment. What would it take, as a percentage of per-capita consumption of energy, in terms of research, and any pollution systems and devices of all kinds.

As I say, if it is 75 percent, if you would have a radical increase in costs, that prudent society might say, Well, elderly people with respiratory diseases are probably going to have to have a pretty tough time. We may not be able to do much about acid rain. But if it is in the nature of 2, 3, 4, 5 percent, maybe we would say under the prudent society rule, that is an investment that we ought to make.

It is a question of how the numbers come out. If you could give us a little analysis of that, it would be extremely helpful.

Mr. **Friedman**. Our numbers are in that order of 2, 3, 4, 5 percent.

Mr. **Scheuer**. I don't want you to just give it to us off the top of your head, because we are going to have some tough convincing to do. So you had better give it to us in as scholarly and workmanlike and professional way as you possibly can, as if the long-term planning department of General Motors or General Electric or United States Steel had produced the document. All right?

Mr. **Friedman**. Yes.

Mr. **Scheuer**. That would be helpful.

[Material to be supplied follows:]

In response to questions about the cost of pollution control, and environmental research and development priorities, we have calculated such costs and prepared a list of R&D options for synthetic fuels.

Acid Deposition - Various estimates have been made of the cost of reducing Sulfur emissions from fossil-fired combusters. Our analysis shows that a range of 2.2 billion of 4.4 billion dollars per year (1981 dollars) will be required to bring about a 50% reduction of Sulfur emissions from existing coal and oil fired electric generating plants in the eastern 31 states. This represents about 2.1 to 4.2 percent of the total amount paid by all customers for electric energy in 1981. Imposition of this level of clean-up technology will raise the average annual electric bill of residential customers (in 1981 that amount was about $512) by $11 to $22 per year.

Currently the EPA program on acid rain R&D is proposing to spend about 14 million dollars in FY1984. The EPA program comprises about half of the proposed FY1984 Federal acid rain research budget ($27.6 million). We have not done an analysis of what constitutes a reasonable R&D budget, but we can offer some rough estimates based on other work we have reviewed. From our limited review we believe that a level of about 20 to 30 million dollars a year may be prudent. Increased funding would probably allow EPA to augment work underway to resolve some of uncertainties that we raised in our testimony and studies on acid rain; however, because such studies typically take one year or more to plan, it might be difficult to wisely use such increase during FY1984. While we have not specified these uncertainties in terms of R&D projects, such projects can be determined from the report material which is enclosed. The relevant sections are marked. The EPA program (and the enclosed report) focus on research to reduce the uncertainty about whether to control acid rain, and if so, by how much. The current EPA research program does not include demonstration projects for promising control technologies being research by the Agency. An additional $5 to 10 million per year for several years beginning in FY1985, while not reducing the uncertainty, might reduce the costs of a control program if enacted by Congress.

Synthetic Fuels - Currently EPA is proposing to spend somewhere in the vicinity of 5 million dollars on environmental R&D directed at synthetic fuels. We have identified a number of areas of uncertainty about the environmental effects of synthetic fuel production for which research may be appropriate. Although the EPA program lists a number of these in their program description, examination of the details shows that their proposed projects will not cover many of the uncertainties. Based on our assessment of synthetic fuels the following is a list of study areas that we believe deserve special attention.

1. Study of the reliability of proposed synfuels environmental control systems in their current use; focus on identification of critical factors affecting reliability, with extrapolation to expected synfuels operating environment.

2. Synfuels environmental control systems development in the absence of regulatory changes that would provide appropriate technology-forcing incentives to the private sector. (Now, reliance on an NSPS-system based on currently available technology provides a negative incentive for private (developer) control system development.)

3. Development of monitoring protocols and inexpensive monitoring technology with special focus on groundwater monitoring for public safety and personal monitors fore occupational safety. Also, focus on more reliable laboratory tests, with possible study of laboratory quality control.

4. Explore the need for epidemiologic studies of fuel handling workers (e.g., gas station attendants) to identify current problems and establish a baseline for synfuels which will be widely distributed.

Many of the synfuels needs, especially those concerned with monitoring and health effects, will be similar or identical to the general needs of hazardous wastes legislation; e.g., groundwater monitoring protocols and technology for landfills, continued development of inexpensive reliable chemical screening tests for the large number of potentially hazardous compounds, etc. Consequently review of those programs would be useful to see where efforts could be combined.

We have not made any detailed estimte of the cost of these suggested topics. Consequently any R&D funding estimates we give here should be viewed as very rough and possibly unable to withstand careful scrutiny. Nevertheless, we feel that a program that we have outlined might run anywhere from 10 to 25 million dollars a year. When synfuel plants are built - assuming that some will be built with the assistance of the Synthetic Fuels Corporation - many of the research areas we suggest should be done in conjunction with those plants. This monitoring of plants could require a considerable increase in R&D funding.

Mr. **Scheuer.** Now, we have to finish in about 10 minutes, so I am going to restrain myself, Dr. Rowberg, and let you finish your testimony.

Dr. **Rowberg.** Well, I am just about finished because I was summarizing some of the environmental and other needs of those two particular technologies.

I wanted to conclude, then, by saying that I have highlighted these uncertainties and dangers, including these environmental problems. Although I spoke primarily about coal, other energy options open to us also have some problems. One that was mentioned earlier today was indoor air quality. There is growing evidence that the quality of our indoor air is worse in some instances than we face outdoors.

Renewable energy sources will also create environmental problems as well. For example, the use of our vast wood resources for energy, which we, in a study on biomass recently, indicated are substantial, will require forest management if we are not to see damage done to the land as a result of increased soil erosion or deforestation of marginal lands.

All of the problems that I have raised or talked about here, at least the environmental problems, can be controlled, but it will require a continuing effort, including an effective research and development program. The window we are offered by this current decline in energy and oil imports gives us the opportunity to carry out this program, but we should not feel that that window is going to be open long.

Thank you, Mr. Chairman. We will continue to answer whatever questions we can.

[The prepared statement of Dr. Rowberg follows:]

Testimony of Richard Rowberg, Energy Program Manager
Office of Technology Assessment
Before
Subcommittee on Natural Resources, Agriculture Research and Environment
House Committee on Science and Technology

April 27, 1983

My name is Richard Rowberg, and I am the Energy Program Manager for the Office of Technology Assesment. With me is Steve Plotkin and Bob Friedman, who are Project Directors on the OTA staff. The purpose of my testimony is to review the current state of energy in this country, to discuss some general characteristics about our energy future, and to point out some environmental concerns about that future. This testimony is based primarily on a recently completed study by OTA, Synthetic Fuels and Increased Automobile Fuel Efficiency and another study now in press, The Regional Implications of Transported Air Pollutants.

In 1982, U.S. energy use was down 4.3 percent from 1981 and down over 10 percent from 1979, the year in which U.S. energy use was at an all time high. This unprecedented decline in demand is primarily a result of conservation efforts in all sectors taken in response to higher energy prices. To be sure, a stagnant economy has also contributed, but increased energy efficiency, as measured by the ratio of economic output to energy input, has been the principal source of demand reduction. In parallel with the decline in demand we have seen a modest increase in domestic energy production since 1975, although it has leveled off since 1980, the peak year. As a consequence of these trends, net oil imports have dropped

PRECIPITOUSLY -- BY NEARLY 60 PERCENT -- SINCE THEIR 1977 PEAK. OIL IMPORTS IN 1982 AVERAGED ABOUT 4.5 MMB/D COMPARED TO ABOUT 9.1 MMB/D IN 1977. ALTHOUGH THIS LEVEL MAY STILL BE TOO HIGH IN TERMS OF NATIONAL SECURITY, THE REDUCTION SINCE 1977 HAS SIGNIFICANTLY REDUCED THAT PRESSURE FOR THE TIME BEING.

ONE COULD CONCLUDE, THEN, THAT THE NATION IS WELL ON THE ROAD TO A STABLE, SECURE ENERGY FUTURE. IF ONE EXAMINES THE DETAILS, HOWEVER, THERE ARE SEVERAL ASPECTS ABOUT OUR CURRENT ENERGY SITUATION THAT GIVE PAUSE FOR CONCERN. FIRST, WHILE CONSERVATION HAS BEEN SUBSTANTIAL -- INDEED OUR RESPONSE HAS EXCEEDED THAT PROJECTED BY THE MOST ENTHUSIASTIC ADVOCATES OF A FEW YEARS BACK -- MUCH MORE IS NEEDED. THERE ARE REASONS TO BELIEVE, HOWEVER, THAT OUR CONSERVATION EFFORTS WILL BE INSUFFICIENT. THERE IS A LARGE, UNFILLED POTENTIAL WHICH EVEN WITH THE CURRENT DECLINE IN OIL PRICES, HAS A VERY HIGH ECONOMIC RETURN. FOR EXAMPLE, IN A STUDY WE PUBLISHED ON ENERGY USE IN BUILDINGS, WE FOUND THAT ALMOST 50% OF THE ENERGY THAT THESE BUILDINGS WOULD NEED IN 2000 COULD BE SAVED BY TECHNICAL AND OPERATIONAL CHANGES THAT WOULD REPAY THE INVESTMENT IN SEVEN YEARS OR LESS. NEVERTHELESS, LESS THAN HALF OF THIS IMPROVEMENT IS LIKELY TO COME ABOUT BECAUSE OF POOR CAPITAL MARKETS AND INSUFICIENT FINANCIAL INCENTIVES. IN THE INDUSTRIAL SECTOR, WE PROJECT THAT ENERGY USE COULD GROW BY LESS THAN ONE PERCENT PER YEAR AND STILL SUPPORT A GNP GROWTH OF NEARLY THREE PERCENT PER YEAR PROVIDED THE NECESSARY INVESTMENTS IN NEW PROCESSES AND PROCESS TECHNOLOGY ARE MADE. ALTHOUGH INCREASED PRODUCTIVITY OR ADAPTING TO A CHANGING PRODUCT MIX ARE THE PRIMARY GOALS OF THESE INVESTMENTS, THEY ARE THE BEST MEANS FOR INCREASING ENERGY EFFICIENCY. MANY OFFER RETURNS ON INVESTMENT IN TERMS OF REDUCED ENERGY COSTS THAT ARE ATTRACTIVE BY ANY STANDARDS. BECAUSE OF CURRENT HIGH INTEREST RATES AND UNDERUTILIZED MANUFACTERING CAPACITY, HOWEVER, THESE INVESTMENTS MAY NOT

OCCUR. FINALLY, WE FOUND THAT THE POTENTIAL EXISTS TO RATHER EASILY INCREASE AVERAGE NEW CAR EFFICIENCY TO 38 MPG BY 1990 AND 51 MPG BY 2000. OVER 70 PERCENT OF THIS IMPROVEMENT IS POSSIBLE WITH INVESTMENTS COSTING LESS THAN COMPARABLE SUPPLY OPTIONS. THESE EFFICIENCY GAINS WOULD REDUCE AUTOMOBILE FUEL CONSUMPTION FROM ITS CURRENT LEVEL OF ABOUT 4 MMB/D TO ABOUT 2 MMB/D BY 2000. INDEED, THE TECHNICAL POTENTIAL FOR MUCH HIGHER FUEL EFFICIENCY EXISTS ALTHOUGH, OF COURSE, THE FUEL SAVINGS ACHIEVED FOR EACH ADDITIONAL GAIN IN MPG WILL GROW LESS AND LESS. THE CURRENT DROP IN AUTOMOBILE FUEL PRICES AND APPARENT CHANGE IN BUYER PREFERENCES, HOWEVER, ARE REDUCING MARKET PRESSURES TO ACHIEVE EVEN THE LOWER EFFICIENCY TARGETS.

SECOND, THERE ARE WEAKNESSES IN OUR DOMESTIC ENERGY PRODUCTION TRENDS. NEARLY ALL THE INCREASE OVER THE PAST SEVEN YEARS HAS RESULTED FROM AN EXPANSION OF COAL PRODUCTION. WHILE OIL AND NATURAL GAS PRODUCTION HAVE STOPPED DECLINING IN THE LAST FEW YEARS, THEY HAVE NOT INCREASED EITHER. COAL PRODUCTION, HOWEVER, HAS BEEN FLAT FOR THE LAST THREE YEARS, LARGELY BECAUSE ELECTRICITY DEMAND HAS BEEN FLAT. FOR THE LAST SEVERAL YEARS THERE HAS NOT BEEN ANY SIGNIFICANT INCREASE IN THE SUBSTITUTION OF COAL DIRECTLY FOR OIL OR NATURAL GAS OTHER THAN ELECTRIC UTILITY APPLICATIONS DESPITE THE CLEAR FUEL COST ADVANTAGE OF COAL. THEREFORE, THE NATION APPEARS TO HAVE REACHED A TEMPORARY HALT IN THE SWITCH TO COAL FROM OIL OR NATURAL GAS. WE ALSO DO NOT EXPECT OIL AND NATURAL GAS PRODUCTION TO INCREASE. INSTEAD, OIL AND GAS PRODUCTION WILL LIKELY CONTINUE A LONG-TERM DOWNWARD TREND. WE PROJECT THAT U.S. DOMESTIC OIL PRODUCTION WILL DROP TO 4 TO 7 MMB/D BY 2000. WHILE WE HAVE NO COMPARABLE ESTIMATES FOR NATURAL GAS YET, THE CONSENSUS OF PROJECTIONS FOR PRODUCTION FROM CONVENTIONAL GAS SOURCES IN THE LOWER-48 STATES IS A DECLINE, BY THE YEAR 2000, OF ABOUT 30%. FINALLY, WHILE WE CAN EXPECT AN INCREASE IN NUCLEAR POWER AS A RESULT OF PLANTS COMING ON LINE THAT ARE STILL UNDER

CONSTRUCTION, SIGNIFICANT OIL DISPLACEMENT WILL NOT TAKE PLACE UNLESS ELECTRIC ENERGY DEMAND GROWTH REMAINS NEAR ZERO FOR MANY YEARS.

THESE SUPPLY CONSIDERATIONS MEAN THAT WE STILL WILL BE VERY LIKELY IMPORTING A SUBSTANTIAL AMOUNT OF OIL BY THE END OF THE CENTURY. IN OUR STUDY ON SYNFUELS WE ESTIMATED AN IMPORT LEVEL OF NEARLY 6 MMB/D BY 2000 ASSUMING THE CONSERVATION TARGETS WE DISCUSSED ABOVE WERE MET. EVEN IN THE EXTREME CASE THAT WE CAN REACH THE TECHNICAL LIMITS FOR AUTO FUEL EFFICIENCY AND THAT CONSERVATION AND FUEL SWITCHING IS SO EFFECTIVE THAT ELIMINATION OF ALL STATIONARY USES OF OIL (BOILERS, PROCESS HEATERS, ETC.) WAS ACHIEVED BY 2000, WE WOULD STILL BE LEFT WITH NEARLY 4 MMB/D OF IMPORTS. ALTHOUGH BELOW CURRENT LEVELS, THE LATTER WOULD REPRESENT NEARLY 40% OF OUR TOTAL OIL CONSUMPTION IN 2000, WHICH COULD STILL CREATE NATIONAL SECURITY CONCERNS. WITHOUT ANY SIGNIFICANT, NEW SUPPLY TECHNOLOGIES TO REPLACE OIL, THEREFORE, WE FACE THE PROSPECT OF CONTINUED HIGH DEPENDENCE ON IMPORTED OIL WELL INTO THE NEXT CENTURY EVEN WITH A SUBSTANTIAL CONSERVATION EFFORT.

WHAT TECHNOLOGIES SHOULD BE CONSIDERED? FIRST, THERE IS THE SUBSTITUTION OF OIL OR NATURAL GAS BY DIRECT USE OF COAL OR ELECTRICITY. INDEED, THE CASE WE DISCUSSED ABOVE OF COMPLETE ELIMINATION OF STATIONARY USES OF OIL REQUIRED SUBSTANTIAL SUBSTITUTION BY ELECTRICITY AS WELL AS USE OF COAL IN ELECTRIC UTILITY BOILERS IN PLACE OF RESIDUAL FUEL OIL. THERE ARE SEVERAL REASONS WHY SUBSTITUTION WILL BE DIFFICULT. TECHNOLOGIES FOR USING ELECTRICITY IN PLACE OF DIRECT COMBUSTION OF OIL ARE EITHER VERY COSTLY TO OPERATE (DIRECT RESISTANCE), ARE STILL UNDER DEVELOPMENT (E.G. MICROWAVE HEATING, PLASMA PROCESSES), OR REQUIRE SUBSTANTIAL TIME AND CAPITAL FOR INSTALLATION. ALSO, MOST ELECTRIC UTILITIES ARE NOW HAVING FINANCIAL PROBLEMS WHICH MAKE INVESTMENT IN NEW, LARGE CENTRAL STATION POWER PLANTS VERY

DIFFICULT AT BEST. IN ADDITION, SLOWER DEMAND GROWTH COUPLED WITH A GREATER DEGREE OF UNCERTAINTY HAVE MADE PLANNING FOR NEW CAPACITY VERY DIFFICULT. SUBSTITUTION BY DIRECT COMBUSTION OF COAL IS ALSO A WAY TO DISPLACE OIL IN SPACE HEAT AND PROCESS HEAT APPLICATIONS. CURRENT TECHNOLOGY LIMITS SUCH SUBSTITUTION TO BOILERS. EVEN THOUGH THERE IS A DECIDED ECONOMIC ADVANTAGE TO MAKING THE SWITCH FROM OIL TO COAL, CONVERSION, AS WE STATED ABOVE, IS NOT TAKING PLACE. INDEED EVEN CONVERSION IN THE ELECTRIC UTILITY SECTOR HAS BEEN MUCH SLOWER THAN WAS EXPECTED WHEN OIL PRICES ROSE SO QUICKLY IN THE 1970S. THIS RELUCTANCE IS DUE IN PART TO LACK OF CAPITAL TO FINANCE CONVERSION ALONG WITH COAL STORAGE AND DELIVERY CONSTRAINTS. ANOTHER REASON IS THE UNCERTAINTY ABOUT THE MANY ENVIRONMENTAL DIFFICULTIES THAT ACCOMPANY COAL BURNING.

SUBSTITUTION OF OIL IS ALSO POTENTIALY POSSIBLE WITH SYNTHETIC FUELS FROM COAL, OIL SHALE AND BIOMASS. SYNTHETIC LIQUIDS, OF COURSE, ALLOW SUBSTITUTION OF OIL WITHOUT SIGNIFICANT CHANGES IN DEMAND TECHNOLOGY. IN OUR STUDY ON SYNFUELS WE FOUND THAT A SIZABLE SYNFUELS INDUSTRY WOULD BE REQUIRED IF THE U.S. WAS TO ELIMINATE OR REDUCE OIL IMPORTS TO A SECURE LEVEL BY 2010. YET WE ALSO FOUND THAT A SIZABLE INDUSTRY WAS UNLIKELY BY 2000. THE MAJOR REASONS ARE THE VERY HIGH INVESTMENTS NEEDED, THE UNCERTAINTY ABOUT FUTURE PRICE OF OIL, AND THE HIGH TECHNOLOGICAL RISKS OF THE FIRST ROUND OF PLANTS. IN ADDITION THERE ARE ENVIRONMENTAL CONCERNS WITH SYNTHETIC FUEL PRODUCTION THAT HAVE CONTRIBUTED TO THE RELUCTANCE ON THE PART OF POTENTIAL INVESTORS TO BEGIN MAJOR SYNFUEL PROJECTS. AT BEST, WE FEEL A LEVEL OF NO MORE THAN 1 MMB/D BY 2000 CAN BE EXPECTED. BEYOND 2000 ASSUMING OIL PRICES DO AGAIN INCREASE (AS IS LIKELY GIVEN THE PROSPECTS FOR DOMESTIC PRODUCTION), THE SYNFUEL INDUSTRY SHOULD GROW PROVIDING AN INCREASING SHARE OF OUR DOMESTIC ENERGY SUPPLY.

OTHER TECHNOLOGIES CAN AND WILL PLAY A ROLE OVER THE NEXT SEVERAL YEARS. CHIEF AMONG THESE IS LIKELY TO BE BIOMASS, PRIMARILY IN THE FORM OF DIRECT COMBUSTION OF WOOD AND CONVERSION OF WOOD AND OTHER CELLULOSIC FEEDSTOCKS (GRASSES, CROP RESIDUES) TO METHANOL AND SYNTHETIC GAS. THE DEGREE TO WHICH BIOMASS CONTRIBUTES TO OUR FUEL SUPPLIES DEPENDS HEAVILY ON HOW WELL IT COMPETES WITH COAL.

IF WE WISH TO KEEP OIL IMPORTS LOW OUR ENERGY FUTURE FOR THE NEXT FEW DECADES WILL REQUIRE A SIGNIFICANT CONSERVATION EFFORT AND AN EXPANSION OF NEW ENERGY TECHNOLOGIES THAT CAN MAKE USE OF OUR ABUNDANT COAL AND BIOMASS RESOURCES. THERE ARE, AS I HAVE MENTIONED, MANY PROBLEMS TO BE FACED IN CARRYING OUT THESE ACTIONS. THOSE PROBLEMS CONCERNING THE ENVIRONMENT ARE POTENTIALLY THE MOST THE SERIOUS, ESPECIALLY CONCERNING COAL USE, AND WARRANT FURTHER DISCUSSION. I WILL ILLUSTRATE THESE PROBLEMS BY DISCUSSING FINDINGS FROM OUR STUDIES ON SYNTHETIC FUELS AIR POLLUTANT TRANSPORT.

ENVIRONMENTAL CONSIDERATIONS

THE PRODUCTION OF LARGE QUANTITIES OF SYNTHETIC FUELS CARRIES A SIGNIFICANT RISK OF ADVERSE ENVIRONMENTAL AND OCCUPATIONAL HEALTH EFFECTS, SOME OF WHICH ARE QUITE DEPENDENT ON THE EFFECTIVENESS OF AS YET UNPROVEN CONTROL MEASURES. THE INDUSTRY WILL CAUSE MANY OF THE SAME KINDS OF MINING, AIR QUALITY, SOLID WASTE DISPOSAL, WATER USE, AND POPULATION EFFECTS AS ARE NOW ASSOCIATED WITH COAL-FIRED ELECTRIC POWER GENERATION AND OTHER FORMS OF CONVENTIONAL COAL COMBUSTION. FOR WATER CONSUMPTION AND EMISSIONS OF SO_2 AND NO_X, THE LEVEL OF IMPACTS CAUSED BY A SYNFUELS PLANT WILL BE LOWER THAN FOR A POWERPLANT PROCESSING THE SAME AMOUNT OF COAL. ON THE OTHER HAND, A 2-MMB/D INDUSTRY WOULD MINE HUNDREDS OF MILLIONS OF TONS OF COAL EACH YEAR, WITH

ATTENDANT IMPACTS ON ACID DRAINAGE, RECLAMATION, SUBSIDENCE AND OCCUPATIONAL HEALTH AND SAFETY, AND WOULD HAVE SUBSTANTIAL POPULATION-RELATED IMPACTS SUCH AS SEVERE RECREATIONAL AND HUNTING PRESSURES ON FRAGILE WESTERN ECOSYSTEMS.

ASIDE FROM THESE EFFECTS, SYNFUELS DEVELOPMENT CREATES A POTENTIAL FOR OCCUPATIONAL, ECOLOGICAL, AND PUBLIC HEALTH DAMAGE FROM THE ESCAPE OF TOXIC SUBSTANCES FORMED DURING THE CONVERSION PROCESSES. THESE INCLUDE CANCER-CAUSING ORGANIC COMPOUNDS, AND INORGANIC TRACE ELEMENTS. THE RISKS ASSOCIATED WITH THESE TOXIC SUBSTANCES, ALTHOUGH POSSIBLY THE MOST SERIOUS OF SYNFUELS' POTENTIAL ENVIRONMENTAL RISKS, ARE NOT QUANTIFIABLE AT THIS TIME.

THERE IS LITTLE DOUBT THAT IT IS TECHNICALLY FEASIBLE TO MODERATE A SYNFUELS INDUSTRY'S ADVERSE IMPACTS TO THE SATISFACTION OF MOST PARTIES-OF-INTEREST. IN OUR JUDGEMENT, HOWEVER, DESPITE SUBSTANTIAL INDUSTRY EFFORTS TO MINIMIZE ADVERSE IMPACTS, THE ENVIRONMENTAL RISKS ASSOCIATED WITH THE TOXIC SUBSTANCES GENERATED BY SYNTHETIC FUELS PRODUCTION ARE SIGNIFICANT AND WARRANT CAREFUL ATTENTION.

CURRENT DEVELOPMENT PLANS AND EXISTING LEGISLATION CALL FOR STRONG MEASURES TO REDUCE MANY OF THE POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS FROM SYNFUELS PLANTS THROUGH INTENSIVE APPLICATION OF EMISSION CONTROLS, WATER TREATMENT DEVICES, PROTECTIVE CLOTHING FOR WORKERS, MONITORING FOR FUGITIVE EMISSIONS AND OTHER MEASURES. THERE REMAIN IMPORTANT AREAS OF DOUBT, HOWEVER, CONCERNING THE ADEQUACY OF ENVIRONMENTAL MANAGEMENT. CRITICAL STUMBLING BLOCKS ARE THE LARGE NUMBER OF SEPARATE COMPOUNDS THAT MUST BE CONTROLLED, AND THE RECENT REDUCTIONS IN THE BUDGETS OF FEDERAL ENVIRONMENTAL AGENCIES AND DEEMPHASIS OF THEIR SYNFUELS RESEARCH PROGRAMS. DETECTING SYNFUELS ENVIRONMENTAL DAMAGES AND TRACING THEM TO THEIR SOURCES -- A KEY REQUIREMENT IN ESTABLISHING AND ENFORCING CONTROL STANDARDS -- MAY BE DIFFICULT BECAUSE MANY

OF THE DAMAGES WILL OCCUR SLOWLY AND THE RELATIONSHIP BETWEEN CAUSE AND EFFECT IS COMPLEX.

IN THE AREA OF DIRECT COAL COMBUSTION ONE OF THE BIGGEST POTENTIAL CONCERNS IS ACID RAIN. THE SLOWER RATE OF CONVERSIONS FROM OIL AND NATURAL GAS FIRED BOILERS TO COAL THAN APPEARS JUSTIFIED ON THE BASIS OF FUEL PRICE DIFFERENTIALS, MAY BE DUE, IN PART, TO UNCERTAINTY ABOUT HOW THE CONGRESS WILL ADDRESS ENVIRONMENTAL RISKS OF COAL COMBUSTION, INCLUDING ACID RAIN. DUE TO THE SCIENTIFIC UNCERTAINTY SURROUNDING THE EXTENT AND MAGNITUDE OF THE RISKS FROM ACID RAIN, ENVIRONMENTAL POLICY DECISIONS THAT AFFECT THE ATTRACTIVENESS OF CONVERTING TO COAL HAVE NOT YET BEEN MADE. INDIVIDUALS CONSIDERING COAL CONVERSIONS DO NOT HAVE A CLEAR IDEA ABOUT THE RISK THEY WILL TAKE IN MAKING THAT CONVERSION. MORE IMPORTANTLY THE NATION DOES NOT HAVE A CLEAR IDEA ABOUT THE OVERALL ECONOMIC AND HEALTH RISKS WE ALL WILL BE TAKING IF WE CONTINUE TO SHIFT TO A GREATER RELIANCE ON COAL. ADDRESSING OURSELVES TO THESE ENVIRONMENTAL UNCERTAINTIES IS A NECESSARY ELEMENT IN INCREASING THE USE OF OUR VAST COAL RESOURCES.

IN OUR ASSESSMENT, REGIONAL IMPLICATIONS OF TRANSPORTED AIR POLLUTANTS, WE EXAMINED SOME OF THE PROBLEMS POSED BY FOSSIL FUEL COMBUSTION. THE REPORT FOCUSES ON THE RISKS OF CONTROLLING AND NOT CONTROLLING TRANSPORTED AIR POLLUTANTS BECAUSE OF CONCERNS THAT THE CURRENT CLEAN AIR ACT, DESIGNED TO CONTROL LOCAL AIR POLLUTION PROBLEMS, DOES NOT ADQUATELY ADDRESS POLLUTANTS THAT CROSS STATE AND INTERNATIONAL BOUNDARIES.

WE FEEL THAT THE SCIENTIFIC EVIDENCE STRONGLY SUPPORTS THE CONCLUSION THAT THERE ARE ADVERSE EFFECTS OF ACID DEPOSITION ON AQUATIC ECOSYSTEMS. HOWEVER, THE EXTENT OF THE EFFECTS -- THE NUMBERS OF LAKES AND MILES OF STREAMS -- IS DIFFICULT TO QUANTIFY. WE ESTIMATE THAT ABOUT 25 PERCENT OF THE

LAND AREA OF THE EASTERN U.S. CONTAINS SOME LAKES AND STREAMS AT RISK FROM ACID DEPOSITION. USING AVAILABLE WATER QUALITY DATA, WE ESTIMATE THAT ABOUT 20 PERCENT OF THE LAKES AND STREAMS IN THIS LAND AREA ARE EITHER EXTREMELY SENSITIVE TO THE EFFECTS OF ACID DEPOSITION OR ARE ALREADY ACIDIFIED.

DAMAGE TO CROPS FROM ACID RAIN UNDER NATURAL CONDITIONS HAS NOT YET BEEN OBSERVED, ALTHOUGH EXPERIMENTS USING SIMULATED ACID RAIN HAVE PRODUCED QUANTIFIABLE ALTERATIONS OF CROP QUALITY AND YIELD REDUCTIONS. THERE IS LITTLE CONSISTENCY AMONG RESULTS OF VARIOUS RESEARCHERS AND THEREFORE NO GENERALLY AGREED UPON CONCLUSION ABOUT THE EFFECTS OF ACID DEPOSITION ON CROPS.

FOREST PRODUCTIVITY DECLINES AND TREE DEATH HAVE BEEN OBSERVED IN PARTS OF NEW YORK, VERMONT, NEW JERSEY AND WEST GERMANY. EACH OF THESE REGIONS RECEIVE ELEVATED LEVELS OF ACID DEPOSITION AND BECAUSE NO OTHER CAUSE IS APPARENT (E.G., INSECTS, DISEASE OR OZONE), ACID DEPOSITION IS A PRIME SUSPECT. HOWEVER, NO FIRM CAUSE AND EFFECT RELATIONSHIP HAS BEEN PROVEN TO DATE.

TRANSPORTED AIR POLLUTANTS -- RESULTING IN PART FROM COAL COMBUSTION -- ALSO POSE RISKS TO HUMAN HEALTH. OF GREATEST CONCERN ARE EXTREMELY SMALL, INHALABLE PARTICLES, INCLUDING AIRBORNE SULFATE TRANSFORMED FROM SULFUR DIOXIDE GAS THAT CAN CAUSE DAMAGE TO LUNGS. IN ADDITION WATER SAMPLES IN AREAS OF NEW ENGLAND AND THE ADIRONDACKS RECEIVING HIGH LEVELS OF ACIDITY HAVE SHOWN LEAD CONCENTRATIONS OF UP TO ONE HUNDRED TIMES HEALTH-BASED WATER QUALITY STANDARDS. NO CAUSAL RELATIONSHIP HAS YET BEEN DEMONSTRATED BETWEEN ACID DEPOSITION AND DEGRADATION OF DRINKING WATER QUALITY. ACID DEPOSITION HAS BEEN IMPLICATED, HOWEVER, BECAUSE ACIDIFIED WATERS ARE CAPABLE OF

DISSOLVING SUCH METALS AS LEAD AND MERCURY FROM PIPES AND CONDUITS IN DRINKING WATER DISTRIBUTION SYSTEMS AS WELL AS FROM SOILS AND ROCK.

CONCLUSIONS

I HAVE ATTEMPTED TO HIGHLIGHT SOME OF THE UNCERTAINTIES AND DANGERS ABOUT THIS NATION'S ENERGY FUTURE AND THE ENVIRONMENTAL PROBLEMS OF THAT ENERGY FUTURE. ALTHOUGH MY EXAMPLES ARE PRIMARILY CONCERNED WITH COAL COMBUSTION, OTHER ENERGY OPTIONS OPEN TO US ARE NOT WITHOUT POTENTIAL PROBLEMS. CONSERVATION IN BUILDINGS RAISES THE ISSUE OF INDOOR AIR QUALITY. THERE IS GROWING EVIDENCE THAT THE QUALITY OF INDOOR AIR IS WORSE THAN WE FACE OUTDOORS. BUILDINGS HAVE BECOME TIGHTER TO REDUCE HEATING AND COOLING ENERGY NEEDS, WITH THE CONSEQUENCE THAT ATTENTION MUST BE GIVEN TO IMPROVING INDOOR AIR QUALITY. RENEWABLE ENERGY SOURCES WILL CREATE ENVIRONMENTAL PROBLEMS AS WELL. THE USE OF OUR VAST WOOD RESOURCES FOR ENERGY WILL REQUIRE CAREFUL FOREST MANAGEMENT IF WE ARE NOT TO SEE DAMAGE DONE TO THE LAND AS A RESULT OF INCREASED SOIL EROSION, OR DEFORESTATION OF MARGINAL LANDS.

ALL OF THE PROBLEMS I HAVE RAISED CAN BE CONTROLLED. IT WILL REQUIRE A CONTINUING EFFORT, HOWEVER, INCLUDING AN EFFECTIVE RESEARCH AND DEVELOPMENT PROGRAM. THE WINDOW WE ARE OFFERED BY THE CURRENT DECLINE IN ENERGY DEMAND AND OIL IMPORTS GIVES US THE OPPORTUNITY TO CARRY OUT THAT PROGRAM. WE SHOULD NOT CONSIDER THAT THE WINDOW WILL BE OPEN LONG, HOWEVER, SINCE WE CAN EXPECT ENERGY DEMAND TO PICK UP IF WE HAVE A SUBSTANTIAL ECONOMIC RECOVERY. NOT ONLY WILL OUR TOTAL ENERGY NEEDS GROW, IN THAT CASE, BUT OUR OIL IMPORTS WILL GROW EVEN FASTER SINCE OIL IS THE SWING FUEL IN OUR ECONOMY. THEREFORE WE CANNOT AFFORD TO WAIT IF WE DESIRE TO REDUCE OUR OIL IMPORT VULNERABILITY. THE CURRENT CHANGE IN DIRECTION AT THE ENVIRONMENTAL PROTECTION AGENCY OFFERS THE OPPORTUNITY TO REVIEW THE DIRECTION OF THE RESEARCH AND DEVELOPMENT PROGRAM AND TO RE-EXAMINE ITS COMMITMENT TO ASSISTING OUR NATION REACH A MORE SECURE ENERGY FUTURE.

THIS CONCLUDES MY TESTIMONY AND I WILL BE HAPPY TO TRY AND ANSWER ANY QUESTIONS.

Mr. **Scheuer.** Your testimony has been very thoughtful and very stimulating.

We have a window of what, 5 or 10 or 15 years, something like that?

Dr. **Rowberg.** Well, 15, I think, is too long. I would suspect that this current period of sort of softness in the oil markets may not be too much longer than 5 years, particularly if economic activity picks up, because the swing fuel is oil. Energy demand may grow by a small percentage, but oil demand will grow by a large percentage because that is the most straightforward fuel to use when you increase the amount of capacity that you are using to produce industrial goods.

Mr. **Scheuer.** We will hold the record open for 10 days. Would you give us a recommendation as to what level of research we ought to carry on and where it should be focused?

Dr. **Rowberg.** As far as a level of research, we would have a problem in the sense that we really have not spent much time looking at the levels. But we can tell you some of the particular areas of research that we feel are important, that may, at least in our cursory reading of the EPA program, not be carried out.

I would be relucant, on the basis of an OTA statement, to say that OTA says we should spend this much because we just have not put the analysis into——

Mr. **Scheuer.** You just said yourself that it is a political decision up here. It is a political decision. But our political decision has to be made on a specific proposal of spending x dollars for Y research.

So for this to be helpful, you have to tell us, you have to give us at least some suggestions, some guidelines, some orders of magnitude. What kind of research ought to be done, and approximately how much should we spend on it, for how many years, to produce a given result.

If you are not going to give us some order of magnitude of what we ought to be spending on research, then in terms of our authorizing process, you are not being anywhere nearly as helpful as you could be. You are here testifying before us on a particular authorization bill. We are not asking you for specifics. You can give us a range. You can put in all kinds of disclaiming statements. We understand the need for that. But give us a practical guideline.

Dr. **Rowberg.** We will see what we can do on that, and the order of magnitude is again the best estimate that we could come up with, limited to the analysis that we have. We will see what we can do on that. It certainly can be a little bit more helpful on the types of problems.

Mr. **Scheuer.** Good, and we will hold the record open for that.

One last question on the question of diesel fuel. Diesel, of course, would be a very excellent fuel for us to have. It would reduce our dependence on Persian Gulf oil and other sources of foreign oil. But it does have certain polluting effects that we are concerned with.

I understand you have done a recent study on diesel fuel. Can you tell us the degree to which it is a serious pollutant, the emissions from diesel vehicles, and what we can do about it, approximately what it would cost, and what its impact would be on the usability of diesel fuel for urban areas or the degree to which it would protect urban areas that have serious pollution problems now and for which the add-on of diesel fuel's polluting effects is a serious matter.

Mr. PLOTKIN. I think the use of diesel technologies is a classic example of uncertainty.

The major potential problem with diesels is the possibly cancer-causing effects of particulates from diesel combustion.

Certain kinds of tests done on diesel emissions indicate that there are cancer-causing agents in the emissions themselves. But other kinds of tests indicate that there may be some doubt that the human body actually will be subjected to those agents.

For example, if you put a solvent on the particulates collected, you can release cancer-causing agents. But it is not clear that the same thing would happen in the human body. The cancer-causing agents are bound very tightly to the particulates, and so even though those particulates may enter the body, the chemicals may not be released to do their damage. Also, the kind of epidemologic evidence that might identify diesel emissions as cancer-causing—or as safe—is limited and inconclusive. Consequently, the question of diesel emission safety is still unanswered.

There are technologies available, potentially available, to control those particulates, but they tend to interfere with the control of other kinds of emissions like nitrogen oxides.

One of the problems that the automakers, for example, have brought up is that if you try to control both nitrogen oxides and particulates to low levels, you cannot do it. It is a tradeoff. If you are willing to allow a little more NO_x, then you can control particulates more, and vice versa.

Certainly in the future I expect control devices will be developed to deal with both simultaneously, but right now they are not available except under certain conditions, for certain kinds of automobiles, and engines. So it is a continuing problem.

Mr. SCHEUER. Do any of you have anything further to add?

Dr. ROWBERG. No. I think we will try to make these estimates and get them back to you.

Mr. SCHEUER. Excellent.

Let me thank you for your patience and your excellent testimony.

The record should show that it is about 6 minutes to 6. You have been very tolerant of the delays this afternoon, and you have given us extremely helpful testimony.

Thank you very much.

Dr. ROWBERG. Thank you.

Mr. SCHEUER. The committee stands in recess.

[Whereupon, at 5:52 p.m., the subcommittee recessed, to reconvene at the call of the Chair.]

APPENDIX I

QUESTIONS AND ANSWERS SUBMITTED FOR THE RECORD

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Honorable James H. Scheuer
Chairman, Subcommittee on Natural
  Resources, Agriculture Research
  and Environment
Committee on Science and Technology
House of Representatives
Washington, D. C. 20515

Dear Mr. Scheuer:

Enclosed are the responses to questions arising out of the March 10, 1983, reauthorization hearing for EPA's R&D program, together with the corrected transcript and two inserts.

I apologize for the week's delay in furnishing the requested information and appreciate your patience.

If I may be of any further assistance, please let me know.

Sincerely yours,

Leland E. Modesitt, Jr.
Director
Office of Legislation

Enclosure

PROGRAM MANAGEMENT

Question 1. Over the past two years, numerous management and organizational studies have been conducted to improve the efficiency and quality of EPA's research program. These initiatives have been used to justify budget cuts in research despite the absence of evidence indicating improved efficiency and quality of EPA research.

What is the status of the efforts to reorganize the Office of Research and Development? What exactly has been done and what improvements have been demonstrated?

Answer. For the past several months of Office of Research and Development (ORD) has proceeded to develop a new organization structure to improve the ORD/client relationship while strengthening the research quality control and internal management processes. ORD is currently conducting the final phase of this reorganization study. Nine ORD "planning advisors," four at Headquarters and five at ORD laboratories, are drafting documents which specifically delineate the working interfaces of the new organizational components. No improvements have been demonstrated since no part of the reorganization has been implemented.

Question 2. Does EPA intend to reorganize and consolidate its 14 research laboratories? Will EPA close any of these laboratories?

Answer. The proposed reorganization, as currently conceived, does not eliminate or consolidate physical locations of ORD field components but consolidates the management of the fourteen ORD laboratories into five. No physical moves of laboratories would occur. Only the reporting relationships would change.

Question 3. What changes will be made in EPA research planning process and how will these changes improve the program?

Answer. EPA has taken several steps to improve the research planning process and will continue to implement them. ORD is emphasizing closer client office contacts in continued support of the research committee system initiated several years ago. The closer contact is demonstrated in research strategies that are developed mutually, frequent transmittal of program documentation and status updates, and jointly held research program reviews.

ORD is also implementing a top-down management process whereby strategic objectives and key projected accomplishments are enunciated by top management. Projects and tasks conducted by the laboratories are carefully constructed and reviewed to be in conformance with the overriding objectives. In this way, ORD establishes a highly responsive program.

Also, ORD is implementing an automated tracking system which clearly identifies expected outputs, their due dates, and monitors progress in achieving them.

Finally, in order to focus our long-term exploratory research, we will proudce a long-term research strategy which will be an important adjunct to the media-specific research strategies already being prepared.

We believe these actions will continue to improve not only the process through which we plan research but ultimately the quality responsiveness and timeliness of our research products.

AIR QUALITY

Health Effects Research

1. i. (1)

Question: What actions will EPA take to improve our understanding of the health effects of air pollutants and, subsequently, the scientific bases of air standards?

Response:

The mission of EPA's health research program is to provide the information necessary to improve the Agency's capability for making scientifically sound health risk assessments.

To fulfill this mission, we perform work in three broad areas:

1) generating experimental dose-response data;

2) developing test methods for use by investigators for EPA and others, such as manufacturers, universities, and other agencies; and,

3) developing improved methods for using dose-response data in risk assessments, including,

    a) methods for extrapolating from high doses to low doses, and

    b) methods for extrapolating from responses observed in animals to those predicted in humans at equivalent doses.

The specific actions taken vary somewhat with each pollutant of concern. In each case, questions must be asked — what is known already, where do data gaps exist, what technology is available, what must be developed? For most criteria pollutants, such as ozone, nitrogen oxides, carbon monoxide, and sulfur dioxide, there are substantial experimental data and reliable test methods already available. For these compounds, our aim is to refine existing knowledge and fill in gaps, especially how these pollutants affect potentially susceptible subpopulations and how they contribute to the development or exacerbation of chronic disease, and to improve existing methods for predicting human risks. For most hazardous air pollutants, on the other hand, there is little or no reliable experimental data, often because the technology for generating and testing these compounds safely has not yet been developed. Also, we often do not know which components of a given air sample are responsible for health effects observed. In these cases, the first step is to devise quick, inexpensive, and reliable tests to identify hazardous compounds in air and to ascertain what biological systems (pulmonary, cardiac, biochemical, etc.) they are most likely to affect. Particles, too, are a special case because the technology does not yet exist to generate some sizes and types of particles safely and reliably. Therefore, while we are working to expand the data available on the particles we can generate in humans and animals, such as sulfate and nitrate aerosols, we must also seek ways to test other particles safely.

Air health research funds are allocated as follows:

Type of Research	FY-83 ($K)	FY-84 ($K)
Dose-response	$ 9,382.6	$ 9,306.4
Test Method Development	301.4	197.3
Better Risk Methods	1,960.8	2,069.1
TOTAL	$11,644.8	$11,572.8

AIR QUALITY

Health Effects Research

Epidemiology

Question: Why has EPA chosen to eliminate epidemiology health studies when the information from such studies are needed to determine actual human response to exposure from pollutants?

Response: We agree that epidemiology is an important part of an environmental health program if it can be done, but we have reached the following conclusions regarding chronic disease epidemiology:

1. Descriptive epidemiology studies have had their uses in the past for EPA, but analytical epidemiology studies are now what are most needed.
2. Most of the health endpoints of concern to EPA, e.g., cancer, heart, lung disease, are also of major concern to other Federal research agencies.
3. Successful analytical epidemiology studies must take into account rigorously all contributors, e.g., smoking, diet, occupation, to the disease or endpoint of understudy.
4. Exposure to environmental pollution is not the sole or even major contributor to many diseases or endpoints of concern.
5. Therefore, effective epidemiology work is difficult to achieve.

EPA's research program in chronic disease epidemiology was eliminated because:

> The complex and lengthy nature of the necessary analytic chronic disease epidemiology studies, such research is best done by other parts of the U.S. Government, e.g., NCI, NIOSH, NHLBI, NIEHS, who already are experienced and organized to do such studies. For EPA to duplicate the expertise which already exists in other parts of the government cannot be justified.

EPA will obtain information from epidemiological research in the following manner:

1. EPA's Center of Excellence for Environmental Epidemiology at the University of Pittsburgh will conduct problem definition and feasibility studies and special research projects for EPA as a need arises in a particular program area.

2. EPA will keep track of epidemiology research being conducted by other Federal agencies and will coordinate and communicate EPA's epidemiology research needs to the appropriate agencies for consideration in the design of their programs. As a problem or feasibility study identifies a research question which merits further investigation, we will approach the proper agency to continue the study. And, EPA will provide monitoring and environmental exposure assessment expertise, if warranted.

3. EPA will continue to actively encourage the conduct of environmental epidemiology studies in academia through the competitive grants program.

4. EPA will continue to focus on research to develop and validate methods to better assess effective dose and biological or sensitive indicators of response.

AIR QUALITY

Health Effects Research

4b.

Question: Will increased funding for scientific assessments of hazardous air pollutants increase our understanding of health effects? If so, how? Will new knowledge be generated from these activities?

Response: Increased funding is needed due to the expanding number of identified hazardous airborne chemicals for which Assessments are required. The scientific assessments will be compiled from health data previously published in the open literature and therefore will not add to that knowledge base per se. These assessments will, however, increase our understanding of health effects by assembling the relevant data on a given pollutant into a single body where they can be examined as a whole and used as a basis for definition of information needs and decisions about research to meet those needs.

AIR QUALITY

Health Effects Research

1.c.

Question:	How has EPA responded to the recommendations of the Clean Air Scientific Committee calling for more attention to health research?
Response:	The recommendations of Dr. Goldstein of the Clean Air Scientific Advisory Committee (CASAC) primarily focused on epidemiological research and research on gases and particles (GAP). We agree that epidemiology is an important part of the GAP research program if it can be done. The most pressing need for data in the GAP program is in the area of chronic obstructive lung disease caused by chronic exposure to ambient air pollution. Many people feel that such epidemiologic studies may be impossible to do in this country now. Virtually everyone agrees that, if such studies are possible, they will have to be prospective in design. Presently, then, we are starting a Program Definition and Feasibility Study to answer, if possible, the question of whether it is reasonable to undertake an epidemiologic study in this country relating ambient air pollution to chronic obstructive lung disease.

AIR QUALITY

Health Effects Research

Diesel Emissions

2.2.

Question: Why is the Diesel program eliminated? What conclusions have been made about the effects of Diesel emissions and what response action will EPA take, if any?

Response: EPA has expended significant resources (about $20 million from 1979 through 1982) to study the possible adverse health effects of diesel exhaust emission products. The remainder of EPA's major effort in this area will be completed in late 1983, with those results in publication by the end of 1984. Components of diesel exhaust have been found to be toxic, mutagenic, and carcinogenic in animal cells and tissues. Based on available results, diesel exhaust extracts have a potency similar to other combustion products.

Additional important questions need to be resolved based on EPA's results and results from General Motors and DOE sponsored research at Lovelace Institute. EPA and the motor vehicles manufacturers are relying on the Health Effects Institute to address these questions. EPA is on record as relying on HEI to be its principal source of health effects data on motor vehicle pollutants. EPA also agreed not to perform research duplicative of that sponsored by HEI, unless scientifically warranted.

Upon receipt of the research results that HEI will obtain in this area, EPA will decide what further regulatory action is warranted.

AIR QUALITY

Health Effects Research

Diesel Emissions

Question: EPA and the auto industry have jointly funded the Health Effects Institute to study diesel emissions. Will this program continue and, if so, why?

Response: HEI may become an important mechanism for government and industry to pool scarce resources in order to obtain quality relevant health effects data. It is hoped that these independently generated and unbiased data should become the starting point for the regulator and regulated to determine the need for corrective action. HEI is addressing motor vehicle pollutants, of which diesel emissions is a subset. HEI will shortly be awarding about $4 million to perform needed research.

With these expectations, EPA will continue to support HEI. Significant health effects research remains to be done on motor vehicle pollutants. EPA anticipates that HEI will become, if all goes well, the major source of studies on the health effects of motor vehicle emissions, with EPA maintaining a strong capability in developing protocols and in conducting more basic health effects research. EPA has also agreed not to perform research duplicative of that sponsored by HEI, unless scientifically warranted. As long as HEI's research remains relevant and high in quality, EPA will rely on HEI.

Air Quality

Control Technology

3.

Question: EPA has eliminated funding for the development of technology to control air pollutants. EPA states that it's not the government's responsibility to develop control technologies for the regulated community. Industry has sufficient resources and incentives to develop control technology.

-- What evidence exists to indicate that industry will invest in development of control technology? If this development occurs, will it focus on both reducing the cost and improving the removal efficiency of control technology? (Increasing the removal capability of control technology could lead to more stringent environmental standards so it is unlikely that industry would strive for this result.)

Answer: During the past ten years an extensive pollution control vendor industry has developed and remains viable. Although there has been an occasional shakeout of marginal firms that were unable to compete in the available markets, the industry itself remains relatively healthy, and may be expected to thrive as economic recovery continues in the period ahead. Evidence of this may be found by referring to trade publications such as the JOURNAL of the WATER POLLUTION CONTROL FEDERATION, CHEMICAL ENGINEERING, and POLLUTION ENGINEERING. In these and similar publications, hundreds of vendor and consulting firms advertise their products and services. More specifically, the October 1982 issue of POLLUTION ENGINEERING is a directory issue which identifies hundreds of firms that provide equipment and services in the environmental control field.

The future research and development plans of these firms cannot be determined with any accuracy on an individual basis. One could assume, however, that progressive companies would avail themselves of incentives such as the 1981 Economic Recovery Act, which provides tax credits for increased research and development, and the increased allowance for Innovative and Alternative construction grants (from 10 percent of cost to 20 percent beginning in 1985) to further strengthen their position in the marketplace as they compete for contracts.

The direction these anticipated research and development efforts might take is open to question. Product development and improvement measures that reduce capital and operating costs, increase equipment reliability, or penetrate new markets could be imagined as research targets for those firms that engage in R&D activities. And as markets open for improved controls that provide increased pollution removal efficiency, in response to more stringent standards the Agency may promulgate, it is reasonable to believe that leading firms will also strive to meet these market opportunities with advanced technology.

It is not necessary to conclude, moreover, that more effective control technologies are correspondingly more expensive and, therefore, are unattractive to the vendor and user communities. Our own development of combustion modification and Low NO_x burners, for example, is evidence of this. Here we can cite an example where effective pollution control and reasonable costs go hand in hand. Our Limestone Injection into Multistage Burner (LIMB) program again demonstrates that effective SO_x and NO_x control at reduced costs are possible. The private sector can be expected, in the years ahead, to provide similar breakthrough developments in their own area of expertise. Firms that do so will enjoy a dominant position in their continuing quest for sales.

Air Quality
Indoor Air Pollution
~~Page 3, #4.~~
4.

Question: Does EPA perceive indoor air pollution as a significant problem warranting research attention? If so, what is EPA's position on establishing such a program within the Agency?

Answer: We believe that the EPA lacks regulatory authority in this area. Therefore no approved long-term research strategy exists for indoor air. Both the fiscal year 1982 and fiscal year 1983 indoor air research programs were one-time efforts responding to specific language in the appropriations bills. In 1982 and 1983 we are investigating and characterizing pollution in public buildings (schools, office buildings, etc.). During 1984 we will be analyzing the results of these studies to determine if any future research is necessary. However, we do recognize a need to measure total exposures of the public to air pollution, and exposure monitoring programs have addressed indoor exposure and returned valuable information on this subject.

R&D Authorization Hearing

March 10, 1983

Air Quality

Item 5. Environmental Monitoring

Environmental monitoring is important for the purposes of enforcement and research which are only as good as the data gathered through monitoring. Most air quality monitoring is performed by the States and has been shown to be inconsistent in quality and quantity.

a.

Question: What are the major problems associated with air quality monitoring and what actions are being taken by EPA to rectify these problems?

Response: Although air quality monitoring performed by States was considered to be inconsistent in quality and quantity several years ago, in 1979 EPA promulgated air monitoring and reporting regulations (40 CFR 58) designed to correct the deficiencies in monitoring and data reporting programs. The regulations are based on the recommendations of the Standing Air Monitoring Work Group (SAMWG) which was composed of representatives of EPA, State and local agencies.

At present, there are 4675 State and Local Air Monitoring Station (SLAMS) monitors meeting all substantive requirements of the regulations including operating under a rigorous quality assurance program. These monitors constitute 94% of the total monitors planned for the SLAMS network.

As a subset of the SLAMS network, which is intended to meet the data needs of State and local air pollution control agencies, 1370 of these monitors have been designated as National Air Monitoring Stations (NAMS). These NAMS provide the EPA with sufficent air quality data to permit national assessments of nationwide air quality status and trends. At present, 98% of the NAMS meet all substantive requirements of the regulations. This program of SLAMS and NAMS is now essentially fully operational, and we consider that the program has solved all of the major problems which existed with the previous monitoring programs.

b.

Question: What assistance does EPA intend to provide the States in their efforts to monitor air quality?

Response: The major assistance which EPA provides is the funding assistance provided through the Section 105 Grant Program. Approximately one-third of those funds are used for the operation of the air quality monitoring and associated programs.

EPA also routinely updates the various monitoring guidelines and technical assistance documents to insure that they reflect the latest technological developments and operating experience for use by the State and local agencies.

We assist States in maintaining monitoring networks which provide consistently high quality data by conducting on-site evaluations of the monitors, conducting performance audits, furnishing quality control check samples for use by State and local agencies, and providing automated data screening procedures to identify any anomalous data which could compromise the quality of the information in the data bank.

EPA is developing a new aerometric information retrieval system based upon the latest automated data processing techniques including a data base management system and modern telecommunications equipment. This system, when operational, will enable full integration of the State and local air quality data systems with the EPA data system.

Water Quality

CONTROL TECHNOLOGY
ENVIRONMENTAL ENGINEERING AND TECHNOLOGY

1. a.

Question: What incentive does industry have to develop controls for water pollution given the fact that advances in this technology would lead to more stringent effluent standards under the Clean Water Act? (The Clean Water Act requires effluent standards which can be achieved with the Best Available Technology).

Answer: It is the philosophy of the Administration that the government should not compete with the private sector in the research and development of pollution control technology and equipment. Therefore, private industry will have the responsibility for carrying out these programs and the role of EPA will be restricted to the identification and evaluation of pollution control options and strategies.

There is no quantitative measure available to determine the extent to which industry can and will develop pollution control technology. However, the decision of the Administration is based on such factors as the existence of an extensive and viable pollution control vendor industry, economic incentives, and tax credits for increased research and development. Further as markets open for improved controls that provide increased pollution removal efficiency, in response to more stringent standards the Agency may promulgate, it is reasonable to believe that leading firms will also strive to meet these market opportunities with advanced technology.

Water Quality
Control Technology

INNOVATIVE AND ALTERNATIVE TECHNOLOGY RESEARCH

1. b. (1)

Question: The Clean Water Act allows a 10% bonus in construction grants to municipalities that use innovative treatment technologies for wastewater. EPA argues that this bonus will lead to private sector development of better technologies. What evidence exists to indicate that the 10% bonus provision in the Clean Water Act will result in technology improvements?

Answer: The national I/A Clearinghouse for information dissemination shows that from October, 1978 - October, 1981, over 2000 Step 1 Innovative and Alternative (I/A) grants were awarded, which included over 80 types of I/A technologies. Of these grants, over 100 have completed construction and reached start-up of which 10 are innovative projects. If all available I/A set-aside funds are obligated for FY82-84, from 34% - 64% of a state's allotment could be used directly on I/A technology with just the 10% grant increase. With the 20% I/A starting in 1985 and the drop from 75% to 55% for conventional projects, the I/A program is expected to reach full dimensions in the public and private sectors.

1. b. (2)

Question: What research assistance will EPA provide to municipalities in treating wastewater?

Answer: Research assistance to states and municipalities by the Office of Research and Development will continue to actively support the Construction Grants Innovative and Alternative (I/A) Technology program. Support will consist of technical reviews of plans for innovative facilities, post-construction evaluations of operating I/A projects, evaluations of I/A field tests when requested by the Office of Water Program Operations, assessments of emerging technologies, technical assistance to States, municipalities and the Construction Grants Program in the area of small wastewater flows and conduct of regional and state technical information transfer seminars.

WATER QUALITY

2. Water Quality Based Standards

a.

Q. Why is EPA trying to implement a water-quality based approach for dealing with water pollution problems? What benefits will be gained?

A. The goals of the Clean Water Act are being pursued essentially in two phases. In Phase I, emphasis was given to putting in place a minimum or base level of point source pollution control across the country. This fundamental level of control is based on the control technology available or economically achievable, without regard to site-by-site considerations of water quality impacts.

As Phase I is being achieved, emphasis is shifting to implementation of Phase II which is a water-quality based approach to water pollution control. In Phase II, emphasis will be given to development and implementation of a national strategy for meeting the goals of the Clean Water Act where the base level of controls, alone, is insufficient to do this. In planning and implementing Phase II there will be a full awareness of and sensitivity to the nation's protracted energy and economic problems. Attention will be given to translating the goals of the Act into site-specific quantitative water quality objectives and to identifying the most cost-effective and energy-efficient water quality management strategy for achieving these objectives in each watershed.

The primary benefit that will be gained by implementing the water-quality based approach will be achievement of the Clean Water Act goals at a much lower cost to the nation than the alternative, viz., blanket application of higher and higher levels of control through the technology based approach, without regard to site-by-site differences in need for any further control.

i.

Q. What specific research would be required to carry out successfully this new approach in water pollution control and how much would it cost?

A. The research required to carry out successfully the water-quality based approach in water pollution control would include the development of techniques for use in establishing site-specific water quality criteria; the development of procedures for identifying water uses potentially attainable; the development and refinement of techniques for translating water quality criteria into source control requirements; providing compliance support for the water-quality based permit program; and providing technical assistance for States to implement this approach. It is estimated that the total costs for these activities from FY 84 to FY 91 would be approximately $60 million.

WATER QUALITY

3. Ocean Disposal of Waste

a.

Question: What is the funding request for this program and what specific research will be performed? What questions will this research try to answer?

Answer: The Agency's ocean disposal research program has two components, ocean dumping research and ocean outfall research. The funding request for this research for FY 84 is $3,633,200, of which $2,474,900 is for Salaries and Expenses and $1,158,300 is for Research and Development.

EPA is charged with regulating waste disposal activities in the marine environment. Among these activities is the disposal in the ocean of wastes such as dredged material, sewage sludge, municipal wastewater and industrial wastes. Recently, the issue of increased utilization of the ocean and coastal waters for municipal and industrial waste disposal has been given renewed appraisal within the scientific community and the Agency. This reevaluation of EPA's past policy on ocean disposal may result in increased utilization of the ocean for waste disposal. The scope of this usage and the short-range and ultimate long-range impacts on the marine environment and our society are the questions we need to prepare to answer. Ultimately the question is - how can industrial and municipal wastes be disposed of with the least environmental consequence and in a cost-effective manner? Pragmatic reasoning dictates that a balance be struck among the disposal options based on scientific data, evaluation of impacts and improved understanding of immediate and long-term effects.

The research program is structured to provide critical information for the development of a responsive and scientifically sound regulatory program. The information needs regarding the proper protection of ocean ecosystems are overwhelming and must be approached systematically and with the proper emphasis. Without the proper approach to our information needs, the oceans could once again be utilized indiscriminately with little regard for long-term consequences.

The major components of EPA's ocean disposal research are: waste evaluation, hazard assessment, dumpsite characterization, dumpsite monitoring, dredged material, outfall impacts, field verification and 301(h) technical assistance.

Waste Evaluation

The ocean dumping permit program needs screening tests that can be used to evaluate wastes proposed for ocean dumping. Although some screening procedures exist, there is a need to revise (simplify, make more accurate and cost-effective) these procedures and relate the results of the tests to impacts observed at dumpsites. This research will develop/revise short-term physical, chemical and biological screening procedures for characterizing the toxicity, persistence and bioaccumulative potential of pollutants in wastes to be ocean dumped. These procedures must be verified to assure that the results obtained from these tests relate to impacts in the field.

Hazard Assessment

A hazard assessment is a process that provides the necessary data and interpretation to define the probability of harm to the marine environment resulting from the dumping of wastes. To measure risk, one must couple biological effects information (effects assessment) with environmental exposure information (exposure assessment). This information is needed to determine the relative safety of ocean dumping a waste and to provide a comparison for various disposal strategies for establishing future ocean dumping policies. This research will develop hazard assessment protocols to permit better evaluation of impacts due to the ocean dumping of wastes. These protocols will consist of procedures for estimating the severity of ecological changes (effects assessment) and procedures for determining the transport and fate of ocean dumped wastes (exposure assessment). Hazard assessment protocols will provide the manager with predictive methodology, complete with decision criteria, integration and interpretive guidance, which is coupled to exposure data to make a judgment on risk.

Dumpsite Characterization

EPA is required to designate new or existing dumpsites for municipal sludge, dredged material, and industrial waste. Siting protocols will provide the technical basis for these designations. A protocol will be developed and tested for the acquisition of physical, chemical, and biological information, and the synthesis of this information to provide the basis for dumpsite designation decisions. This synthesis will provide preliminary exposure assessment scenarios as a function of different source inputs and waste types for given sets of site characteristics. Existing physical, chemical, and biological data will be synthesized for selected disposal sites.

Dumpsite Monitoring

Dumpsites are required to be monitored to detect any unacceptable impacts (acute or chronic) which might occur after ocean dumping has taken place. Adequate dumpsite monitoring procedures are limited. Those procedures which do exist need to be field validated. Procedures to monitor dumpsites for chronic long-term effects will be developed/validated to aid in determining if a dumpsite should be changed or the dumping of certain wastes should be discontinued due to unacceptable impacts.

Dredged Material

Procedures to evaluate dredged material prior to ocean dumping need to be developed, revised and/or field validated to provide an adequate set of tests for the ocean dumping and 404 permit programs. Since the transport and fate characteristics of pollutants common to contaminated sediments play a major factor in determining availability and these factors are not well understood, this information needs to be developed to permit better assessments of impacts from ocean dumping of contaminated sediments. This research will develop, revise and field validate procedures to evaluate toxicity (acute and chronic) and bioaccumulation potential of contaminants in sediments for use in the 404 and ocean dumping permit programs. In addition, the transport and fate characteristics of pollutants common to contaminated sediments will be determined.

Outfall Impacts

The Agency has a need for data on pollutant inputs and effects to carry out regulatory requirements under Section 301(h) and 403(c) of the Clean Water Act. Adequate procedures and information to assess the impacts of these discharges are limited. This research will develop/evaluate procedures to describe and assess the impacts of discharging wastes through ocean outfalls for use in setting permit conditions for 403(c) permits and issuing 301(h) waivers. This research will improve the technical basis for regulation of outfall discharges, develop criteria for the protection of resources and develop predictive methodology for relating waste discharge practices to temporal/spatial exposure conditions.

Field Verification

If an applicant receives a 301(h) waiver or a 403(c) discharge permit there is a requirement that a monitoring program be conducted. Adequate monitoring techniques are limited. Also there are questions as to what information needs to be collected and how it is to be interpreted. Research will be designed to take full advantage of the unique field opportunities resulting from the required monitoring programs. Monitoring also provides a means to evaluate the adequacy of outfall impact assessment techniques being developed. This research will develop and/or evaluate techniques to be used in mandatory monitoring programs required if a 301(h) permit modification is issued. Information needed to determine what type and amount of monitoring needs to be done will be developed and the significance of any changes observed (how to interpret the data).

301(h) Technical Assistance

Technical assistance will be provided to those concerned with 301(h) waivers to the mandatory secondary treatment requirement for the discharge of municipal wastewater through ocean outfalls.

b.

Question: Is EPA coordinating its activities in this program with similar programs in other Federal agencies, such as NOAA?

Answer: The ocean disposal research program is being implemented through a strongly coordinated effort which involves EPA marine laboratories and other agencies, such as NOAA and the Corps of Engineers. Coordination activities include joint research planning, review of research, data sharing and cooperative research projects. This effort helps to eliminate duplication of effort, assures the efficient use of resources and makes the best use of the skills available.

4. Great Lakes ~~Research~~ Water Quality

a. Q. WHAT REACTION HAS EPA RECEIVED FROM CANADA AND THE GREAT LAKES STATES TO THE TERMINATION OF THIS PROGRAM? HOW DOES EPA INTEND TO RESPOND TO THESE CONCERNS?

A. The Canadians have historically been critical of any budgetary or programmatic action which might be perceived as a lessening of U.S. concern for Great Lakes water quality and for meeting the U.S. commitments of the Great Lakes Water Quality Agreement of 1978. Concerns expressed by the Canadians in the summer of 1982 resulted in ~~the~~ conducting the Great Lakes Program Oversight by a Coordinating Committee including representatives of EPA's Offices of Water, Management Systems and Evaluation, International Activities, Research and Development, and the Administrator for Region V in Chicago. The Committee was chaired by Frederic A. Eidsness, Jr., Assistant Administrator for Water.

The principle findings of the Program Oversight with regard to eutrophication and toxic contaminants were as follows:

o The removal of phosphorus by municipal treatment plants is close to meeting the goals set in the Agreement with Canada. (1982 Report on Great Lakes Water Quality, Great Lakes Water Quality Board to the International Joint Commission, November 1982.)

o A 10-year study by the Corps of Engineers in the Maumee River Basin west of Lake Erie has shown that conservation tillage is the most cost-effective means to reduce the phosphorus loadings from principal agricultural areas in Ohio, Michigan and Indiana. (Final Report, Lake Erie Wastewater Management Study, Corps of Engineers, Buffalo District, September 1982.)

o With regard to the scope and depth of research activities, the oversight findings indicated that Great Lakes related needs could be met through the Agency's national research program. This year's research priorities for the Agency are as follows:

-- Provision of technical assistance to State and local governments in the application of already completed research on setting phosphorus load limits,

-- Research and development of predictive techniques for evaluating the pathways, fate, and exposure levels of toxics substances in freshwater systems,

-- Research on the health and ecological impacts of persistent toxic substances which is related to planned work under the Toxic Substances Research Program on standard tests for determining the health and ecological impacts of toxic substances,

-- Research for estimating the interactive effects of toxic pollutant combinations,

- -- Provision of scientific support to the International Joint Commission's Water Quality Board and Science Advisory Board, and
- -- Provision of technical assistance to Federal, State and local surveillance and monitoring activities, including standardization and quality assurance.

Officials of the Canadian government and Environment Canada have been briefed on the findings of the Great Lakes Program Oversight and are generally satisfied with the results.

4. Great Lakes Research

Q. Will any research be performed specifically on the Great Lakes to address toxic pollution found in those waters? How much funding will go to this research and where will it be performed?

A. The Agency is not requesting any resources in FY 84 for research to be performed specifically on the Great Lakes to address toxic pollution found in those waters. However, many of the Agency's research activities are relevant to the Great Lakes. With respect to the toxic pollutants, planned Agency FY 84 research includes:

(a) Toxic Pollutant Behavior Predictive Techniques

Several significant research efforts will be undertaken in FY 84 on predictive techniques for evaluating the pathways, fate, and exposure levels of toxic substances in freshwater aquatic systems. They are to be funded under the Toxic Substances Control Act and Clean Water Act appropriations. Although they are directed at generic toxic pollutant problems across the U.S., most of this work would be applicable to the Great Lakes toxic pollutant problems. Planned activities (and associated FY 84 funding levels) that are closely relevant to these needs are the following:

- Development of validated exposure assessment methodologies ($1160 thousand).
- Development of transport and fate process data and protocols ($310 thousand).
- Development of microcosms and model ecosystems for predicting fate, transformation, effects and movement of chemicals loads ($980 thousand).
- Development, refinement and testing of wasteload allocation models and the methodologies for predicting total maximum daily loads ($910 thousand).

The primary differences between the above planned outputs (total funding of $3.36 million) and similar ones that would have been produced under the Great Lakes Research Program is that the latter ones would have been designed and calibrated to be specifically applicable to problem areas in the Great Lakes. The above planned outputs will have to be calibrated (and possibly modified) for specific problem areas before they can be applied.

(b) Effects of Persistent/Residue Toxic Substances

In FY 84, significant research efforts will be devoted to the study of health and ecological impacts of toxic water pollutants. These are to be funded under the Toxic Substances Control Act and Clean Water Act appropriations. These include:

- Development and validation of test methods for studying aquatic, terrestrial and comparative toxicology ($1580 thousand).
- Development, refinement and validation of protocols and methodologies to support the water-quality based approach to pollution control ($1130 thousand).

Again the above planned outputs (total funding of $2.71 million) with some modification would be applicable to the Great Lakes toxic pollution problems.

HAZARDOUS WASTE RESEARCH AND RESOURCES FOR DISPOSAL METHODS
ENVIRONMENTAL ENGINEERING AND TECHNOLOGY

1. Control Technology
1.a.

Question: What research is EPA doing to determine the most effective and safe method for disposal of hazardous waste among the various options, e.g. landfill, thermal destruction, ocean dispose, detoxification, etc? What is the best disposal option and what research is EPA doing to promote or allow this option to be used?

Answer: The following activities are being carried out during FY 83 or are planned for FY 84. Total resources are shown for each major category.

Incineration FY 83 - $6,613,000 FY 84 - $5,492,000

Evaluation of rotary kiln and liquid injection incinerator to determine their effectiveness in destroying a variety of hazardous wastes.

Development of sampling and analysis protocols for incineration emission assessment.

Determination of the thermal destruction characteristics of a variety of hazardous compounds under flame and non-flame mode condition.

Assessment of the destruction efficiency of several high temperature industrial processes, i.e. cement kilns to determine their applicability for hazardous waste destruction.

Assessment of the applicability of innovative technologies, i.e. plasma arc for the destruction of hazardous wastes.

Land Disposal FY 83 - $6,215,600 FY 84 $5,217,000

Design and evaluate liner systems for hazardous waste landfills and surface impoundments including methodology for predicting their effectiveness and the development of methods for detecting failures and repairing them.

Assessment and field verification of landfill cover systems and their adequacy in preventing leachate formation.

Assessment of inorganic and organic leachates on natural and synthetic liner permeability.

Evaluation of the effectiveness of encapsulation and fixation processes in stabilizing hazardous waste.

Land Treatment FY 83 - $1,660,000, FY 84 - $1,727,000

Assessment of bioassay techniques to determine the environmental impact of land treatment techniques.

Evaluation of land treatment technologies on a variety of hazardous waste including petroleum refinery sludges and ignitable and corrosive wastes

Evaluation of the effects of industrial wastes on soil biota and an assessment of the effects of loading on degradation rates.

There is no one option which is best for all combinations of wastes, geographical conditions, climatic conditions, etc. For this reason, the EPA is conducting research in all areas to define the conditions under which each disposal method should be used.

Hazardous Waste

1. Control Technology

i.e.

Question: Liners used to contain hazardous waste in landfill may degrade and fail over time causing escape of dangerous pollutants. What is EPA doing to evaluate these liners and to improve technologies for containing hazardous wastes at landfills?

Answer: The FY '83 program will focus on liners, covers, and the chemical reaction of pollutants on liners. Emphasis will be placed on expanding the data available to properly evaluate the design and operating characteristics of synthetic membrane liners and soil liner containment systems and cover systems. Studies will emphasize determining the resistance of liners to chemical waste pollutants, liner performance under various chemical and physical regimes, expected useful life and tests available to verify proper liner/cover design, fabrication and installation. Information will advance the state-of-the-art for predicting long term performance and expected useful life of these containment systems.

Research on covers will study the effectiveness of cover materials to prevent/control infiltration of water into waste disposal sites. Emphasis will be on the impact of subsidence, vegetation and other physical impediments to the integrity and performance of covers, liners, and drainage systems. Long term performance reliability will be enhanced by evaluating maintenance free vegetation to prevent or minimize the reforestation of cover soil.

Studies on the chemical reaction of pollutant on liners are designed to determine flow rates of leachate through clay and synthetic liners, effective porosity of soil liners, prediction of landfill capacity, and effects and control of gas volatilization at hazardous waste landfills.

Hazardous Waste

1. Control Technology

1.c.

Question· For economic reasons landfills are most often used to dispose hazardous waste. Other disposal options such as incineration and detoxification are viewed as safer but are more expensive. What is EPA's position on developing these other disposal technologies to reduce their cost and thereby making them more attractive to use?

Answer: EPA research strategy at the present time includes. among other things. the development of a thorough understanding of the thermal destruction of wastes and the use of this information to determine combustion conditions adequate to insure the prescribed levels of destruction efficiency for hazardous wastes. Development of the data base on this technology and the applicability of using existing incineration facilities or high temperature industrial process for disposal of hazardous wastes will be conducted. One potential or promising technology which is now receiving emphasis is land treatment of hazardous wastes.

Land Treatment is a fairly recent concept providing an alternative for the detoxification of certain hazardous wastes for which conventional incineration or land disposal are neither feasible. cost-effective. nor environmentally appropriate. Land treatment uses the natural. biological chemical and physical processes of the soil for degrading. attenuating. or otherwise rendering waste innocuous. It offers many economic and environmental advantages for the disposal of hazardous wastes. There are. however. many unknowns relative to facility design and operating criteria and waste/soil complexities and interactions. Research is being planned to explore the limits of this technology so it can be used fully where applicable. Land treatment appears to be cost-effective in terms of capital. energy and operating costs. Land treatment appears to produce no residues for which further disposing would be required and is not as land consumptive as is landfilling. After closure. the land appears to be easily reclaimable for beneficial uses.

HAZARDOUS WASTE

2. Monitoring

2.a.

Question: What research will be performed in developing methods and instruments for monitoring hazardous waste at disposal facilities and landfill sites?

Answer: The following research projects will be performed relative to the above question:

1. Report on selection of indicator parameters for groundwater detection monitoring.
2. Develop downhole sensing methods for hazardous waste site monitoring.
3. Develop soil gas sampling techniques of chemicals for exposure assessment.
4. Evaluate portable x-ray flourescence screening instrument for metals.
5. Evaluate remote sensing techniques on opertional sites for impact assessments.
6. Develop sampling network design techniques for soil monitoring.
7. Evaluate unsaturated zone monitoring techniques for soil monitoring.
8. Develop geophysical techniques for detection of leachate plumes in groundwater.

2.b.

Question: What is the present state of development for hazardous waste monitoring techniques?

Answer: The projects and areas identified above represent the state-of-the-art in hazardous waste monitoring techniques. Each of the projects previously identified are in various stages of development with interim reports produced once a particular project stage is completed. For instance, as part of the unsaturated zone monitoring project, a report will be issued in late 1983 describing the results of field testing vadoze zone monitoring techniques at hazardous waste sites. The overall project will be completed in early 1985. An interim report and operations manual on portable x-ray fluorescence detector will be issued in late 1983 and the final report in 1984. A report describing the feasibility of using complex resistivity tests for tracking leachate plumes for hazardous waste sites will be issued later this year.

Interim reports for other projects will be produced ~~in~~ primarily in 1984, with project completion reports in 1985.

Hazardous Waste

3. Health Effects

Question 3. What is known about the health effects of complex mixtures of hazardous wastes? What research will EPA perform to understand better the health effects of hazardous waste as they exist in the real world?

At this time, very little is known about the health effects of complex mixtures in hazardous wastes. Moreover, this is a difficult problem to research because no two hazardous wastes are alike in chemical composition. Not only are the species of chemicals different from waste to waste, but where the chemicals are the same, the ratio of these chemicals varies from waste to waste.

Therefore, we have to deal with the chemical combination as well as the question of additive effects, synergism and even antagonism. We must also deal with short-term effects, chronic effects and target organ specificity. We must consider the effect on normal people, the young, the old, and special sensitive (predisposed) subgroups in the population. Until recently, the methodology has been unavailable to analyze adequately (rapidly, reliably, cost-effectively), the chemical composition of hazardous wastes, or to determine the toxicity of the mixtures in an effective manner.

Our research, therefore, has concentrated on development of methods to evaluate the potential health effects of complex waste mixtures. The program under development uses three (3) levels of in vitro - in vivo assays of increasing complexity to estimate the biological activity of complex mixtures.

Level I consists of rapid, inexpensive methods capable of screening large numbers of waste samples. This level employs biological techniques in the areas of mutagenesis/carcinogenesis, general toxicology, neurotoxicology, reproductive teratology, and immunotoxicology. At the same time, research is performed to integrate chemical analyses of waste samples with their biological effects to help identify those components responsible for the mixture's toxic activity. Levels II & III consist of more comprehensive, longer-term studies designed to quantify and define the specific toxicological effects of the wastes which display severely toxic or chronic effects in Level I tests. Levels II and III will be employed when a more sophisticated data base for regulatory or enforcement decisions is required.

As this tier approach test methodology is finalized, validation and field testing will be conducted. The evaluation will employ a series of pure compounds with known biological effects. This validation effort is necessary to demonstrate the accuracy of the Level I protocol in detecting the range for biological effects that could be expected for complex waste mixtures.

It should be mentioned that our research into complex mixtures also involves: evaluation and analyses of mixtures such as found in the air, water, and soil; development of mathematical models for prediction of toxicity; and methods which can use data on molecular structure descriptions or combinations which will predict genetic and carcinogenic activities using pattern recognition and statistical techniques.

Hazardous Waste

4. Section 301 of Superfund

QUESTION:

Section 301(a)(1) of Superfund requires EPA to submit a comprehensive report to Congress by 1983 which shall include, among other things, an "assessment of ... degree of hazard and risk of harm to public health, welfare, and the environment resulting from (hazardous waste)"

-- What research does EPA plan to perform to satisfy the requirements of Section 301 of Superfund? Is this research reflected in the budget request?

ANSWER:

Section 301(a)(1)(G) of CERCLA requires an assessment of whether it is feasible and desirable to alter the taxes established in Title II of CERCLA with a schedule of taxes which would take into consideration: the likelihood of a hazardous substance release; the degree of hazard and the risk of harm posed by such a release; and other factors identified in the statute.

The comprehensive report is due to Congress in 1984, in that §301(a)(1) specifies "within four years after enactment of this Act." Therefore, EPA will develop and execute a comprehensive plan for conducting the entire set of studies required under §301(a)(1), and those additional studies under §301 that are not clearly the responsibility of other federal agencies.

The study under Section 301 of CERCLA does not require specific scientific research beyond the research that EPA is conducting to support implementation of CERCLA. Therefore no resources in the research budget have been specifically provided for this study.

INTERDISCIPLINARY RESEARCH

Grants and Centers Programs

Question: What problems have been experienced with the research grants and centers program and what action will the Agency take to correct them? How will this program be managed?

Answer: We feel that we must devise a long-range strategy for both the Grants and Centers programs that can be incorporated into the grants solicitations and into the missions of the Centers. We are also assessing ways to improve the relevancy review of grant applications. A current ongoing review of the Centers is disclosing the need to improve the management guidance and direction that they receive from the Agency; steps will be taken to provide this management.

2. Question: How will EPA ensure that research funded out of this program is both high quality and relevant to EPA needs?

Answer: To ensure high quality, we will continue our excellent peer review panel procedure, the purpose of which is to select only the highest quality of research proposals for funding consideration. We are currently assessing ways to improve the relevancy of the grants. The development of a long-range strategy is one such change.

3. Question: Why did EPA propose transferring this program to the National Science Foundation and then abandon the proposal?

Answer: In the budget submission, we indicated a transfer of $4 million, out of a total of $10 million, to the National Science Foundation (NSF) to administer part of the long-term Grants program. We had intended to assess, on a pilot basis, potential improvements that might accrue from the transfer of the entire Grants program to NSF. Since that decision was made, discussions between EPA and NSF have convinced both agencies that the transfer would not serve the long-term interests of the Grants program. The proposed pilot transfer of $4 million in 1984 has, as a result, been withdrawn. EPA will administer the entire $10 million 1984 program itself.

Energy Research

Question: Why has EPA chosen to reduce so substantially its research on energy pollution? Does EPA believe that problems in this area have already been resolved or will be resolved by the private sector?

Answer: Excluding the exploratory research transfer, the total reduction for multimedia energy in the President's FY 1984 budget is less than $0.1 million. $0.1 Because acid deposition is such a major problem in the energy field, EPA continues to dedicate substantial resources to better understand its causes and effects. In fact, we requested a modest increase in the budget for acid rain research. We continue to carry out essential work in the health effects, engineering, and technological aspects of synthetic fuel development; and the development and evaluation of the Limestone Injection Multistage Burner (LIMB) low NOx control technology. The reduction of EPA support for energy research over the last several fiscal years is the result of three major developments:

- a slowdown in commercialization efforts by U.S. industry of synthetic fuel facilities;
- increased U.S. industry cooperation in federal environmental research programs; and
- programmatic changes within EPA's energy research budget reflecting the completion of various research efforts and the consolidation of existing research programs into the base research programs.

As the energy crisis has become less intense and the price of crude oil has declined, U.S. industry has moderated its interest in synthetic fuel production. Within the past several years, the private sector has substantially reduced support for commercialized synthetic fuel facilities. Most recent indications of reduced support were:

- withdrawal of Bechtel Petroleum and Ashland Synthetic Fuels from the Breckinridge Coal Liquefaction Project in November 1982;
- withdrawal of Standard Oil of Ohio from the Hampshire Coal Indirect Liquifaction Project in October 1982; and
- the Exxon Corporation and the Oil Shale Company closure of the Colony Oil Shale Project in May 1982.

Cooperative research by the federal government and industry has started to increase. The Electric Power Research Institute and the Gas Research Institute are negotiating with EPA on a number of joint research endeavours including:

- cooperative funding on process water reuse in synfuel cooling towers;
- synfuel acid gas removal solvent testing at the EPA/North Carolina State University gasifier clean up test facility; and
- co-sponsorship with EPA and the Synthetic Fuels Corporation of a Synfuels Symposium.

In addition to cooperation with industry, EPA has a strong record of cooperation with other federal agencies such as the Department of Energy. As the synfuels program matures, EPA is phasing out of demonstration programs such as fluidized bed combustion. Further, as EPA completes programs (e.g. mining and reclamation; coastal ecosystems) our funding requirements diminish. We have also identified similarities in several research objectives which allow us to consolidate several energy-related research efforts (e.g. SOx, NOx, and particles energy research programs) into existing base research programs.

Neither EPA nor industry will resolve the problems associated with energy pollution independently. The need for cooperation is best characterized in our measured and reasonable approach to evaluating the synfuel industry. As industry proceeds with development of commercial synfuels operations, EPA will keep pace in assessing the potential environmental problems which might result from such development.

2.
Question: Declining oil prices and a weak U.S. economy have caused domestic energy activities to decline. This presents an opportunity to conduct environmental research so that when energy development increases again, environmental problems can be avoided. Do you believe this opportunity should be exploited or should we wait until problems occur?

Answer: Much of EPA's future synfuels research is predicated on obtaining data from full scale private sector development facilities in the United States. As private sector interest declines, so do opportunities for EPA to obtain such data. The costs are prohibitive for EPA to construct full scale demonstration facilities that will provide the environmental and engineering information necessary for quality research. As industry proceeds at a reduced, yet measured rate of development, EPA will respond by providing reasonable and timely research results.

EPA has initiated negotiations for site access and environmental testing at a number of commercial scale synfuel plants currently under construction. The exploitation of such opportunities is dependent upon a grant of access from the commercial developer. If access is granted, EPA should be able to characterize pollutants and evaluate air, water, and solid waste controls at a commercial scale coal conversion or oil shale synthetic fuel plant in 1983. We expect to take full advantage of such opportunities as they arise.

RADIATION

Health Effects Research

Question: Termination of the radiation program implies we know the effects of non-ionizing radiation on human health. What are these effects?

Response: The Office of Research and Development has prepared a comprehensive critical review and assessment of the biological effects of radiofrequency radiation. The external review draft of this document will be available in April and will be reviewed by the Agency's Science Advisory Board. We believe the health effects data now available will allow development of credible environmental exposure guidelines, formally known as the Federal Radiation Protection Guidance for radiofrequency and microwave radiation. Since this guidance is expected to be issued in late 1984, no additional health research will be needed for incorporation; hence, the EPA health research program will not be funded in FY 1984 and beyond.

RADIATION

Health Effects Research

2,

Question: Does exposure to frequencies emitted from high voltage transmission lines pose a human health danger?

Response: In 1975, the Agency solicited comments and information to develop a data base on the potential health and environmental effects of extra high voltage power lines. The consensus was generally that there appeared to be no immediate risk, and that in order to more fully assess this issue, additional research in the area would need to be initiated. EPA has not conducted studies on the effects of high voltage power lines, but the Department of Energy (DOE) does have an extensive research program in this area.

APPENDIX II

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

PUBLIC AND SCIENTIFIC AFFAIRS BOARD
AMERICAN SOCIETY FOR MICROBIOLOGY

1913 I STREET, N.W.
WASHINGTON, D.C. 20006
TELEPHONE: CODE 202, 833-9680

April 16, 1984

Mr. George Kopp
House Subcommittee on Natural Resources,
Agriculture Research and Environment
Committee on Science and Technology
821 House Office Building Annex 1
Washington, D.C. 20515

Dear Mr. Kopp:

This is to request that the attached letter regarding the Public and Scientific Affairs Board's comments on the Administration's budget proposal for exploratory research at the Environmental Protection Agency (EPA) in Fiscal Year (FY) 1985, be inserted in the hearing record for the EPA's Fiscal Year 1985 authorization. The letter was sent to members of the Subcommittee on April 16.

Sincerely,

Janet Shoemaker

Janet Shoemaker
Assistant Director
Public Affairs

JS/jt
enclosure

PUBLIC AND SCIENTIFIC AFFAIRS BOARD
AMERICAN SOCIETY FOR MICROBIOLOGY

1913 I Street, N.W.
Washington, D.C. 20006
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April 16, 1984

The Honorable James H. Scheuer, Chairman
House Subcommittee on Natural Resources,
Agriculture Research and Environment
Committee on Science and Technology
821 House Office Building Annex 1
Washington, D.C. 20515

Dear Chairman Scheuer:

The Public and Scientific Affairs Board (PSAB) of the American Society for Microbiology (ASM) wishes to submit the following comments on the Administration's budget proposal for exploratory research at the Environmental Protection Agency (EPA) in Fiscal Year (FY) 1985 for the record and consideration by the House Subcommittee on Natural Resources, Agriculture Research and Environment, Committee on Science and Technology.

First, we would remind you that the ASM is the largest single biological life science organization in the world with an active membership of over 31,000 microbiologists working in academic, industrial, and government laboratories throughout this country and elsewhere. Since some microorganisms are agents of pollution and others contribute to pollution abatement, the ASM and its membership have conscious and continuous interest in EPA research functions and programs. The ASM is of the firm opinion that a national strategy for environmental protection must include as an essential element a well-funded, long-range program of exploratory research based on a system of peer review to assure scientific merit. This opinion prompted us to write previously expressing distress at the fate in recent years of the EPA effort in research and development.

The EPA grants program, which has experienced drastic reductions in funding, is of particular interest to our membership. It was budgeted originally at $26 million per year. Although this amount is not at all generous, considering the complexity of the country's environmental problems, it has experienced shrinkage at a degree strikingly clear from data tabulated below:

Research Grant Support

Year	Millions	New Awards
1981	$21.8	-
1982	$13.0	100
1983	$ 9.5	45
1984	$ 9.5	26
1985	$10.0	36

In the five year interval of 1981-85, dollar support for research grants has decreased to less than one-half of its initial level and numbers of new awards have decreased 64 percent. We are convinced that those reductions in money and in numbers of new awards have discouraged highly qualified investigators from addressing environmental problems of public importance, and prompted them to turn away from the EPA and to look elsewhere for recognition and support. Nevertheless, with the reappointment of William D. Ruckelshaus as Administrator, we, as many others, believe things at the EPA will change and change rapidly. We are impressed by his accomplishments as first Administrator of the Agency, and recognize that from the time of his reappointment, Mr. Ruckelshaus has worked with some success to strengthen the EPA research budget.

We are pleased that the President's FY 1985 budget proposal would increase support for EPA research and development by approximately $33 million. However, that level of funding is still 24 percent less than the 1981 budget. Moreover, we estimate that no more than an additional $0.5 million of the $33 million increase will be available for research grant support; a sum which translates to only 10 possible additional new awards in 1985. This commitment is much too meager for Mr. Ruckelshaus to proceed as indicated in his March 14, 1984 statement to the House Committee on Science and Technology, " ... to strike the proper balance between shorter and longer term research." In his statement, Mr. Ruckelshaus also volunteered the " ... estimate that over 20 percent of our (EPA) total research funds is devoted to long-term projects." His 20 percent estimate is based on the requirement established in May 1983 by the House Committee on Science and Technology that " ... directs the Administrator to obligate and expend at least 20 percent of the funds appropriated ... for long-term environmental research and development." That is reassuring. However, we would be interested in an accounting of how the 20 percent was arrived at: What programs are included and what criteria are used to differentiate long-term from short-term projects?

We strongly recommend that in FY 1985 research grant support at the EPA be reestablished at the original level of approximately $26 million, and that in FY 1986 the sum be increased to twice that amount. An expenditure of over $50 million is not excessive if the nation is to have a strong research program capable of responding to present and anticipated needs for knowledge in the environmental sciences as they relate to human well-being.

Finally, we wish to express agreement with the areas described as deserving of increased research support by Mr. Ruckelshaus in his March 14, 1984 statement to the House Committee on Science and Technology. Included were health and risk assessment, methods to control and manage toxic and hazardous chemicals, engineering to support current and future regulatory activities, quality assurance of environmental data, and research to understand the causes and effects of acid deposition. However, we regret this list of key research areas does not include an explicit statement of priority for programs designed to increase understanding of the environmental implications of genetic engineering. We are of the opinion that the EPA should be the lead Agency in funding research relating to the environmental effects of products of genetic engineering. Biotechnology is advancing at a remarkably rapid rate, and there is need to assess and to plan to manage any associated risk, if the public is to enjoy the benefits of genetic engineering with a minimum of delay.

We welcome this opportunity to express these thoughts and we are prepared to work with you in any way that may be helpful.

Sincerely yours,

Robert Williams
Robert P. Williams, Ph.D.
President, American Society
for Microbiology

Harlyn O. Halvorson
Harlyn O. Halvorson, Ph.D.
Chairman, Public and Scientific
Affairs Board, ASM

David Pramer
David Pramer, Ph.D
Chairman, Committee
on Environmental
Microbiology, PSAB

cc: The Honorable Don Fuqua
The Honorable Larry Winn, Jr.

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